FACTORS DETERMINING THE LOCATION OF IMMIGRANT INDUSTRY WITHIN A UK ASSISTED AREA : THE SCOTTISH EXPERIENCE BETWEEN 1945 AND 1970

Robert A. Henderson

Department of Social
and Economic Research

Thesis submitted for the Degree
of Master of Letters (M. Litt.)

October, 1977

ACKNOWLEDGEMENTS

I would like to thank Professor Cameron for his continuous advice, encouragement and assistance throughout the course of this project. His perpetual enthusiasm has proved an invaluable stimulus and sustaining force.

My supervisor, John Firn, has been of valuable assistance and support, helping to see the project through to its conclusion. I am also grateful to Mary Latham for her patient guidance and help with the various computing problems encountered during the course of the work.

This work would never have reached its final form without both the tolerance and typing skills of my wife, Eileen, who has spent many weary hours at the typewriter as the project went through its draft and final stages.

CONTENTS

SUMMARY

Since the war regional development policies have placed a great deal of emphasis on stimulating employment creation in the less prosperous areas of the UK by encouraging manufacturing firms to locate their new investment within such regions. Empirical studies have generally sought to identify either the employment and investment impact of government regional policy or the reasons why firms have moved production from the non-assisted into the Assisted Areas. Little attention has been given to the factors influencing the choice of location once a firm has decided to invest in a particular assisted region.

Since location considerations frequently operate only at a particular geographical scale there is no certainty that the reasons for a firm's choosing a specific location coincide with those which brought it to the region as a whole. This study, unlike previous empirical work in the UK, concentrates on the factors determining a firm's choice of site within a specific Assisted Area. The analysis concentrates upon Scotland because it has been a large recipient of incoming industry during the 1945-70 period, and is sufficiently large, in both employment and spatial terms, to be able to offer a wide choice of potential sites.

During the course of this period a number of distinct trends have become apparent in the regional distribution of incoming industry within Scotland. Until about 1960 nearly three-quarters of the mobile jobs went to the West of Scotland, but thereafter that region's dominance declined noticeably as industry moved into other parts of the country. The counties of Fife, West Lothian and Stirling proved particularly successful in obtaining new industry during the 1960s, although Lanarkshire continued to attract more new employment than any other area.

A number of hypotheses are generated to try and explain the changing distribution pattern of new immigrant industry. Traditional location theory with its emphasis on transport costs and profit maximisation is considered to be of limited analytical value. Consequently the hypotheses tested in this study assume satisficing rather than maximising behaviour. Nevertheless location decisions are constrained by economic considerations so that a manufacturer will only locate within those areas where production is expected to be profitable. However, once the general area of search for a new site is identified an industrialist faced by uncertainties over future cost and market trends, possessing partial and imperfect knowledge and information, and under pressure to start production in the new plant as soon as possible, is likely to select the first suitable location. It is extremely unlikely that this will also be the place where profits can, in theory, be maximised. In practice, given all the uncertainties, it is doubtful if such a location can actually be identified. Consequently personal preferences and aspirations are likely to figure in the final choice of site.

This study, using multiple regression analysis, provides support for the hypothesis that the cost of factor inputs determines the general but not necessarily the specific location selected by immigrant industry. Although the availability of labour and factory space are significant factors in every period, the perceived image of an area, by affecting a decision maker's psychic income, can also influence the location of new manufacturing plants within an Assisted Area such as Scotland. Personal considerations appear to have become increasingly important over time and a number of reasons for this trend are suggested. As spatial cost differences decline and competing areas begin to provide comparable facilities, so industry is able to choose from a wider range of potentially profitable locations. Changes in the spatial cost structure of factor inputs have allowed psychic cost considerations to assume a growing prominence for incoming industry.

Such trends help to explain the changing distribution of new industry within Scotland during the course of the post-war period. The pronounced cost advantage formerly enjoyed by Clydeside and Dundee as a result of their labour reserves and factory space,

much of it government owned or built, was steadily reduced. Labour became more generally available as unemployment rose in the 1960s, government financial assistance was extended to most of the country, and both new industrial sites and factories were widely developed within Scotland. Areas such as Glasgow, with high psychic costs, began to experience competitive difficulties in their efforts to attract new industry, unless they possessed sufficient offsetting economic advantages. Incoming firms moved into different parts of Scotland and away from many of the traditional manufacturing areas which they had previously preferred on account of their lower production costs.

PART I

INTRODUCTION, DATA AND HYPOTHESES

CHAPTER 1

MOBILE INDUSTRY AND REGIONAL POLICY

1.1 THE IMPORTANCE OF MOBILE INDUSTRY

Regional development policies have been actively pursued and developed in the United Kingdom since the war, following their introduction in the 1930s in response to the mass unemployment concentrated in the older industrial areas such as Central Scotland, Northern England and South Wales. A persistent component of this policy has been the encouragement to private manufacturing firms to move either all or part of their production away from those areas where supplies of labour and other factor inputs are in relatively short supply to those where they are relatively abundant (Cameron and Clark, 1966).

Central government intervention was initially undertaken for social welfare and political reasons, but the rationale subsequently extended to embrace economic motives (McCrone, 1969; Sant, 1975). The presence of high unemployment rates with their associated problems of low per capita incomes and high out-migration generate strong political pressure on central government to take action in order to avoid the opposition parties' benefitting from any protest vote. Regional policy has sought to alleviate welfare problems of poverty and deprivation by income generation through employment creation and by spatially redistributing income it embraces the concept of social justice.

The shift of emphasis towards an economic rather than social welfare or political justification for policy began in the early 1960s with the Toothill Report (1961), which was followed by the 1963 White Papers concerned with programmes for development and growth in Central Scotland and North East England. All these documents emphasised the need to promote more rapid regional growth by encouraging development in the economically most favourable areas rather than in those with the greatest problems.

In the mid-1960s the economic case was greatly strengthened with the argument that regional policy could contribute to the growth of national output and the raising of efficiency since high unemployment and low activity rates are indicative of under-utilised resources. The addition of extra capital inputs in the prosperous areas to fixed labour inputs, assuming full employment, will yield diminishing marginal physical output, whereas similar capital inputs elsewhere will bring additional labour inputs into use, so that marginal physical output will increase. Consequently there will be a net benefit in output terms to the country (Cameron and Clark, 1966).

It has been estimated that if the unemployment rates in the less prosperous regions of the UK could be brought into line with those in the prosperous south there could be a rise of perhaps 2% or 3% in the national labour force (NEDC, 1963). By utilising spare resources in this way the cost of government intervention can be outweighed by lower public expenditure on unemployment and welfare benefits and gains to revenue in the form of higher income and Corporation tax (Needleman, 1968). In fact, Moore and Rhodes (1973b) have attempted to quantify these Exchequer flows on an annual basis between 1963 and 1970. They estimate that the increase in the budget deficit was only about £60 million, which has "minimal monetary implication". They further estimate that the gain to output as a result of regional policy between 1963 and 1970 was about £500 million per annum by 1970, which is double the non-recoverable Exchequer costs of about £250 million in the same year.

Regional policy is also justified on the grounds that it can reduce cost inflation by spreading the demand for labour more evenly

throughout the country, thereby maintaining national output expansion for a longer period than would otherwise be possible. The alternative is excessive cost pressure on resources, especially of labour, in the prosperous regions if national demand is to be increased sufficiently to enable resources to be fully employed elsewhere in the country. Consequently the government is compelled to instigate a deflationary policy before the spare resources in the less prosperous areas are utilised, resulting in a potential loss of ourput and income (Cameron and Clark, 1966; McCrone, 1969).

Once the decision to implement a regional policy is taken, the government is faced with finding the most effective method of intervening and this depends on both policy objectives and the nature of the problem. In the UK the main priority has been to reduce unemployment (McCrone, 1969) and this gives rise to basically two policy options. Either employment opportunities can be expanded in the less prosperous areas ("work to the workers") or people in these areas can be encouraged to seek work in the more prosperous regions ("workers to the work"). Priority has been given in the UK to the first of these options, although they are not mutually exclusive.

This reflects the view that extensive and persistent out-migration has a number of undesirable spill-over effects and may be self defeating. Migration tends to be selective of the young and skilled, thereby draining the less prosperous areas of many of their most enterprising and ambitious people upon whom hopes of economic recovery are likely to be heavily dependent (Needleman, 1968). It also decreases aggregate demand in the exporting regions both directly and indirectly via the income multiplier, thereby worsening the operating environment of firms dependent on the local market. In addition, by moving into areas of full employment such migrants add to inflationary pressures at least in the early years by adding to the demand not only for local goods and services but also for social capital expenditure (Needleman, 1968).

Consequently policy has sought to stimulate employment creation within the less prosperous areas. During the study period of

1945-1970 this was attempted largely by seeking to redistribute employment opportunities within the United Kingdom by diverting to such areas external growth generated in the more prosperous regions. In this way they stood to benefit from the new employment created and the diversification of their industrial structure (Cameron and Clark, 1966).

Firms can move their manufacturing activities to regions of low labour demand in a number of ways. They can either close a factory in one area and transfer production to a new location, or open a new branch plant, or shift additional production to a plant already established in one of the less prosperous regions. Basically two methods have been used to encourage firms to undertake such moves. Negative controls, in the form of Industrial Development Certificates (IDCs)[1], are designed to prevent firms building new factories in labour deficit areas, while positive encouragement is provided by giving financial incentives to firms moving to the less prosperous or assisted areas (McCrone, 1969).

This policy of encouraging the movement of manufacturing plants into areas such as Scotland from elsewhere has achieved a reasonable degree of success (Howard, 1968). In Scotland, for example, by 1970 incoming manufacturing firms provided about 115,000 jobs, which was equivalent to 16% of Scottish manufacturing employment. This has helped to create new job opportunities to offset those lost by the contraction of established industry, although a deficiency of employment still persists. Howard (1968) provides some indication of the scale of the problem. He shows that by 1966, although about 50,000 jobs had been provided in Scotland by outside industry which had come since 1951, this only counterbalanced a net loss of 51,000 manufacturing jobs in established industry over the same period.

1 These were required before new factory premises could be built for manufacturing purposes. The minimum size above which an IDC was required varied in the study period from 1,000 to 10,000 sq ft, depending on the area concerned and the government policy at the time.

The importance of mobile industry to regional policy has been considered by a number of studies. Brown (1972), for example, estimates that about 40% of the jobs attributable to policy were provided by firms moving into the development areas. This, however, contrasts with the conclusion reached by Moore and Rhodes (1974) that nearly three-quarters of the jobs in Scotland generated by regional policy were provided by new immigrant industry, rather than in long established firms.

Although policy has recently begun to place greater emphasis on stimulating internally generated growth in the Assisted Areas it seems likely that efforts to attract mobile industry will remain important elements of policy. Consequently studies of such industry are of interest and relevance to regional policy.

1.2 TYPES OF MOBILE INDUSTRY

When considering mobile industry it is possible to identify two main types which Keeble (1971) has discussed in terms of a dual population hypothesis because of their differences in destinations, establishment characteristics, and the reasons for their choice of location. Both types of mobile industry have been utilised to pursue physical and regional planning objectives.

Keeble (1971) distinguishes between long distance movement to the peripheral areas[2] from the prosperous centres of the South East and West Midlands of England, and relatively short distance moves from congested metropolitan areas to overspill towns in the surrounding region. Establishments moving to the peripheral areas tend to be larger, with an over-representation of plants in the

2 These correspond approximately to the Development Areas as they were defined in 1970 and comprise the standard regions of Scotland, Wales, Northern England, North West England and South West England.

electrical engineering, textile and clothing industries, and they comprise relatively more branch plants but fewer transfers than short distance overspill moves.

The actual reasons for undertaking a move are similar in both groups, with output expansion being the dominant motive. This puts pressure on local resources such as labour, land and factory space. If these become obtainable only at a prohibitive cost or are rendered unavailable by central or local government policy in the form of the refusal of an IDC or planning permission, then output growth can only be undertaken by moving to a new location (Cameron and Clark, 1966; Keeble, 1968; ILAG, 1973).

Once the decision to move is taken, empirical studies suggest that different sets of locational factors operate on the two types of movement. Establishments locating only short distances from metropolitan areas seek to minimise the distance moved because proximity to the metropolis is of overriding importance to retain access to markets, inputs, skilled labour, information or for personal considerations (SE Study, 1971). By undertaking such moves establishments may harmonise with physical planning policies designed to overspill population and industry from the central city to the surrounding reception areas (Henderson, 1974).

From the point of view of regional policy, the decision to undertake a long distance move to an Assisted Area is of greater interest and a number of interview studies and statistical analyses have examined the reasons for moving and for selecting a peripheral area location. Howard (1968) produced much of the basic data on inter-regional industrial movement and this has provided the basis for a number of subsequent studies. The Department of Industry undertook a large scale inquiry in which they questioned all firms who opened a new manufacturing plant in the 1964-67 period in an area where they had not manufactured previously. The Inquiry into Location Attitudes Group survey, 1973 (ILAG) covered new plants in all regions including both Assisted Areas and non-assisted areas. It sought to determine a firm's reasons for opening a plant in a new location, the factors determining its choice of new location and its experience in the new location. This has been the most comprehensive interview study and was preceded by more limited

studies. Keeble (1968) interviewed manufacturing firms which moved to the peripheral areas from North West London and Cameron and Clark (1966) undertook a detailed analysis of those moving from non-assisted areas in a different region during the period 1958-63. A slightly different approach was adopted by Cameron and Reid (1966), who investigated firms which rejected a location in Scotland in favour of one in another Assisted Area. This study explicitly sought to identify the perceived locational disadvantages of a particular area instead of relying on determining this by implication from replies given to questions seeking positive reasons for the choice of location.

Statistical analyses formulating their hypotheses largely on the basis of micro-level interview studies have tended to provide complementary findings and suggest that the main reasons for inter-regional movement have been satisfactorily identified. Keeble (1972) studied industrial movement from the West Midlands and South East of England to the peripheral areas and correlated the volume of movement with both the availability of labour and the distance of the reception area from the origin region. Sant's (1975) analysis covered movement between all British sub-regions and considered the influence of a large number of variables, which enabled him to identify the main factors influencing the volume of movement from and to sub-regions.

1.3 THE OBJECTIVES OF THE STUDY

1.3.1 The Relevance of Different Spatial Scales

In considering the reasons why firms choose to locate a new plant in a particular area it is necessary to distinguish between those factors which are important at one spatial scale but not another (Greenhut, 1959). Haggett (1965) has pointed out that the explanatory variables responsible for a particular geographical distribution may vary according to the spatial scale upon which the analysis is based. He quotes McCarty (McCarty, Hook and Knos, 1956) in support of this view: "In geographic investigation it is apparent that conclusions derived from studies made at one scale

should not be expected to apply to problems whose data are expressed at other scales. Every change in scale will bring about the statement of a new problem, and there is no basis for assuming that associates existing at one scale will also exist at another."

A hierarchy of spatial scales can be identified, ranging from the international level, such as when an American company decides in which European country to locate (Forsyth, 1972), to the inter-regional level, where the decision relates to the choice of a particular region within one country (ILAG, 1973), to the intra-regional scale, where alternative locations within the chosen region are compared (Keeble and Hauser, 1972), to the smallest scale of the intra-urban level, where alternative sites in a particular town are considered. As Haggett (1965) expresses it, "each explanation nests within the other and operates within the general restraints set by the next highest factor".

There may be a single overriding factor which dominates at every spatial scale or different reasons may operate at each. Interview studies often fail to clarify which scale is being referred to and therefore answers may be ambiguous since firms are not asked to rationalise their choice in this explicit way. The availability of government incentives, for example, may explain the reasons for choosing an Assisted Area, but not why one particular area was preferred to another. Similarly, labour availability may account for the choice of the Scottish Assisted Area, but it does not necessarily explain why one part of Scotland is selected instead of another, unless the firm moves to the largest labour market.

The role of different factors in operation at different scales can be illustrated by reference to American firms which have set up manufacturing plants in Scotland. Forsyth (1972) showed that demand factors such as access to the UK or European markets were the main reason for a location in the UK, but cost reducing factors such as government incentives were responsible for the preference for an Assisted Area. Scotland was favoured amongst such areas mainly for its labour supply and local market growth. The choice of location within Scotland was not examined in any detail, so it is not possible to see whether similar reasons also operated at this geographical scale.

The empirical studies explain in general terms why one particular region or sub-region has been preferred to another, but they are less concerned with the reasons for the intra-regional choice of location. There have been no detailed studies to examine why those establishments identified in the dual population hypothesis as moving long distances from the non-assisted areas to the peripheral regions located in one part of the chosen region rather than another, although this is of interest to regional planners and regional development agencies in the Assisted Areas. Although extensive attention has been devoted to the inter-regional choice of location, analyses of intra-regional locations have tended to concentrate on the decisions of establishments moving within the same region (Keeble and Hauser, 1971; Henderson, 1974) and to ignore those made by plants moving into a region from elsewhere.

This study seeks to make a contribution to remedying this situation by examining the locations chosen by those plants which came to Scotland in the post-war period between 1945 and 1970. It discusses changes in the destinations selected within Scotland and examines possible reasons to explain why areas have varied in their attraction for incoming industry. The findings suggest possible policy options for trying to improve the quality of an area's resources in order to improve its ability to attract mobile industry within the context of an increasingly competitive environment.

1.3.2 The Reasons for Concentrating on Scottish Locations

The analysis of the intra-regional location preferences of immigrant industry concentrates on Scotland for a number of reasons. The country has been a relatively large recipient of inter-regional mobile industry and Howard (1968) has shown that between 1945 and 1965 Scotland obtained about 22% of all the establishments and employment that moved to the peripheral areas, being second only to the North West region of England in the number of jobs provided by incoming industry. In addition, Scotland attracted more plants with a foreign origin than any other region, gaining 58% of the employment created in the peripheral areas.

Scotland is also large enough both in employment and in spatial terms to offer a wide range of potential locations as befits a place with about 25% of the insured employees and about 50% of the land surface of the peripheral areas. It can offer sites ranging from densely populated metropolitan centres to remote rural areas and contains examples of all the main types of economic and social problem regions: a fact which has been recognised by the continuous designation of Clydeside, which is the most persistent of these, as an Assisted Area throughout the study period and by the steady increase in the size of the area eligible for government incentives. Scotland encompasses wide variations in the characteristics of its factor inputs and in the quality of its resources both spatially and temporally. This is reflected in the relative economic performances of its sub-regions and in their varying ability to attract mobile industry during the course of the post-war period. This is illustrated by Table 1.1, in which the temporal and structural variations displayed by incoming industry are shown.

The temporal movement pattern reflects that of the peripheral areas as a whole, namely a post-war peak succeeded by a reduced inflow in the 1950s and a revival in the 1960s (Howard, 1968; Sant, 1975). These fluctuations have been shown to coincide with the vigour with which central government pursues regional policy, since an active policy diverts a larger share of mobile industry to the Assisted Areas (Rhodes and Moore, 1975; Sant, 1975). The study concentrates on the period prior to the development of North Sea oil, which has introduced a new component into the factors encouraging inward investment. Many of the oil related projects are very large and, as in the case of oil platform producers, have specific site requirements. Consequently they will complicate any attempt to identify general location factors operating to attract firms to, or repel them from, specific areas.

Immigrant industry, in terms of both establishments and employment, is dominated by three sectors: mechanical engineering (SIC 7); instrument/electrical engineering (SIC 8/9); and clothing (SIC 15). These industries provided between half and three-quarters of incoming employment in each period (Table 1.1). The prominence of the engineering sector can be explained in terms of the

TABLE 1.1 INDUSTRIAL STRUCTURE OF IMMIGRANT ESTABLISHMENTS MOVING INTO SCOTLAND

Industry	1945-51						1952-59					
	Estabs		Max Emp (000)		End Period Emp (000)		Estabs		Max Emp (000)		End Period Emp (000)	
	No	%	No	%	No	%	No	%	No	%	No	%
Food, drink etc	12	8.3	2.2	3.5	0.6	2.4	8	10.6	4.5	15.0	2.6	18.4
Chemicals	8	5.6	1.7	2.8	1.5	5.9	5	6.7	1.3	4.4	0.5	3.5
Metal manuf	3	2.1	0.2	0.3	0.2	0.8	2	2.7	0.1	0.3	0.1	0.7
Mech Eng	18	12.5	17.8	28.2	7.3	29.0	9	12.0	7.4	24.8	3.0	21.3
Instr Eng	11	7.6	11.1	17.6	3.2	12.7	2	2.7	1.0	3.3	0.1	0.7
Elec Eng	20	13.9	13.6	21.6	2.9	11.5	11	14.6	6.0	20.1	2.9	20.6
Venicles	3	2.1	3.0	4.8	1.2	4.8	2	2.7	0.9	3.0	0.4	2.8
Metals nes	15	10.4	2.5	3.9	1.6	6.3	7	9.3	1.5	5.0	0.5	3.5
Textiles	22	15.3	4.3	6.8	2.8	11.1	6	8.0	0.8	2.7	0.6	4.3
Leather and clothing	16	11.1	4.1	6.5	2.8	11.1	6	8.0	2.7	9.0	1.8	12.8
Bricks etc	6	4.2	1.0	1.5	0.5	2.0	6	8.0	1.5	5.0	0.4	2.9
Timber furniture	5	3.4	0.5	0.9	0.3	1.2	1	1.3	0.2	0.7	0.1	0.7
Paper, printing etc	2	1.4	0.8	1.2	0.2	0.8	5	6.7	0.9	3.0	0.6	4.3
Other manuf	3	2.1	0.2	0.4	0.1	0.4	5	6.7	1.1	3.7	0.5	3.5
Total	144	100.0	63.0	100.0	25.2	100.0	75	100.0	29.9	100.0	14.1	100.0

Industry	1960-65						1966-70					
	Estabs		Max Emp (000)		End Period Emp (000)		Estabs		Max Emp (000)		End Period Emp (000)	
	No	%	No	%	No	%	No	%	No	%	No	%
Food, drink etc	8	5.9	2.4	6.0	1.1	4.6	9	5.3	0.5	2.0	0.3	1.6
Chemicals	7	5.2	1.3	3.3	0.7	2.9	8	4.7	0.2	0.8	0.2	1.0
Metal manuf	4	3.0	0.2	0.5	0.1	0.4	3	1.8	1.1	4.5	1.1	5.8
Mech Eng	22	16.3	4.1	10.3	2.4	10.1	19	11.2	1.1	4.5	0.9	4.7
Instr Eng	3	2.2	1.6	4.0	1.5	6.3	6	3.5	1.8	7.4	1.6	8.4
Elec Eng	14	10.4	9.2	23.1	4.5	18.8	31	18.2	8.0	32.8	6.7	35.3
Vehicles	10	7.4	8.8	22.1	7.5	31.4	2	1.2	0.1	0.4	0.1	0.5
Metals nes	13	9.6	1.5	3.8	0.8	3.4	13	7.6	1.4	5.7	1.0	5.3
Textiles	4	3.0	1.5	3.8	0.6	2.5	10	5.9	0.8	3.3	0.5	2.6
Leather and clothing	27	20.0	6.0	15.1	2.9	12.1	36	21.2	6.0	24.6	4.1	21.6
Bricks etc	8	5.9	1.2	3.0	0.8	3.4	10	5.9	0.6	2.5	0.4	2.1
Timber furniture	2	1.5	0.1	0.2	0.1	0.4	7	4.1	0.6	2.5	0.4	2.1
Paper, printing etc	3	2.2	0.4	1.0	0.2	0.8	6	3.5	1.3	5.3	1.1	5.8
Other manuf	10	7.4	1.5	3.8	0.7	2.9	10	5.9	0.9	3.7	0.6	3.2
Total	135	100.0	39.8	100.0	23.9	100.0	170	100.0	24.4	100.0	19.3	100.0

Key

Estabs - Number of immigrant establishments starting production in the period
Max Emp - Maximum employment at any time provided by immigrants starting in the period
End Period Emp - Employment provided at the end of the period in which production started

relationship between employment and/or output growth with mobility (Cameron and Clark, 1966; Howard, 1968). Howard (1968) showed that the mechanical and instrument/electrical engineering industries undertook the largest employment expansion of any industry groups in the UK between 1953 and 1966.

Cameron and Clark (1966) suggest that an additional reason for their prominence was that engineering firms were "most likely to be persuaded of the merits of Assisted Area development and most willing to establish new producing units separate from existing non-assisted plants". They attribute a readiness to consider an Assisted Area location to four main factors. Firstly, transport costs are only a small proportion of total costs; secondly, labour is more readily available than in the area around the main plant; thirdly, labour costs are likely to be lower, not so much because of lower basic rates, but as a result of a time lag before wages in the branch plant follow increases at the parent establishment; finally, additional management costs arising from a new and separate production unit distant from the main factory were not considered to be excessive, especially in the case of larger, more self-contained units.

In the case of the clothing and footwear plants (as there was only one of the latter this group will be referred to simply as the clothing industry in future references) a different explanation has to be sought because this was a contracting industry, in that employment declined nationally between 1953 and 1966 (Howard, 1968). Its prominence can probably be explained by its labour intensive nature and the need for female labour, since "a shortage of labour in existing locations is frequently the motive for moving and this situation sometimes arises in industries where employment is contracting. Moves undertaken primarily for this reason tend to be cases where labour accounts for a substantial proportion of inputs" (Howard, 1968).

Several important changes have occurred in the structure of the immigrant industry moving to Scotland since 1945. Some industries have increased in prominence, some have decreased and others have fluctuated in importance (Table 1.1). The best examples of the first type are the electrical engineering (mostly electronics) and

clothing industries, while mechanical engineering, chemicals and textiles have decreased in importance. In contrast, food, drink and tobacco (1952059), instrument engineering (1945-51 and 1966-70) and motor vehicles (1960-65) were prominent only during certain periods.

These changes in the industrial structure are important because they can affect the demand for factor inputs so that a different set of locational factors become significant. This is considered further in later chapters, although it is pertinent to note that such changes have coincided with a pronounced shift in the regions selected within Scotland by incoming industry (Table 1.2). Immediately after the war about three-quarters of new industry, measured either in establishment or employment terms, moved into West Central Scotland, with most of the remaining jobs arising on Tayside. Throughout the 1950s West Central Scotland continued to attract three out of four of the incoming jobs and it was not until the 1960s that this persistent pattern began to break down. Incoming plants began to display a greater willingness to select locations away from the heavy industrialised areas of the Clyde Valley, especially at the other end of the central belt in Fife and West Lothian. After 1965 the movement of new immigrant plants away from West Central Scotland continued and there was a wider dispersal over the whole country rather than simply to East Central Scotland. Since it was the smaller establishments which were the most willing to locate outwith Central Scotland this new pattern was less pronounced in employment terms.

During the course of the post-war period three main trends in the regional distribution of incoming industry stand out. These are the dominance of West Central Scotland until about 1960, the growing prominence of East Central Scotland in the 1960s until it vied with West Central as the most favoured region for immigrant industry in the late 1960s, and the relative move away from these two regions into the rest of Scotland after 1965. Some idea of the relative magnitude of these shifts can be given by quoting a few figures. West Central's share of incoming employment more than halved from about 78% down to about 35%, whereas East Central increased its share from about 3% up to about 37%. After 1965 Falkirk/Stirling attracted about 12% of immigrant industry

TABLE 1.2 THE REGIONAL DISTRIBUTION OF IMMIGRANT INDUSTRY

Region	1945-1951						1952-1959					
	Estabs		Maximum Employment (000)		End Period Employment (000)		Estabs		Maximum Employment (000)		End Period Employment (000)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
W. Central	109	75.7	45.1	71.5	19.6	77.8	46	61.3	23.0	76.9	11.5	81.6
Falkirk/ Stirling	2	1.4	0.1	0.2	*	*	4	5.3	2.0	6.7	1.1	7.8
E. Central	9	6.2	1.4	2.2	0.9	3.6	8	10.7	1.8	6.0	0.4	2.8
Tayside	15	10.4	14.5	23.0	4.3	17.0	7	9.3	1.3	4.3	0.5	3.6
Borders	3	2.1	0.3	0.5	0.2	0.8	2	2.7	0.4	1.3	*	*
South West	1	0.7	0.1	0.2	*	*	1	1.3	0.2	0.7	0.1	0.7
North East	3	2.1	1.4	2.2	0.2	0.8	2	2.7	1.0	3.4	0.3	2.1
Highlands	2	1.4	0.1	0.2	*	*	5	6.7	0.2	0.7	0.2	1.4
Total	144	100.0	63.0	100.0	25.2	100.0	75	100.0	29.9	100.0	14.1	100.0

Region	1960-1965						1966-1970					
	Estabs		Maximum Employment (000)		End Period Employment (000)		Estabs		Maximum Employment (000)		End Period Employment (000)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
W. Central	77	57.1	22.3	56.0	11.5	48.1	63	37.1	9.2	37.7	6.4	33.7
Falkirk/ Stirling	8	5.9	0.8	2.0	0.6	2.5	15	8.8	2.7	11.0	2.4	12.7
E. Central	35	25.9	14.7	36.9	10.9	45.6	49	28.8	8.6	35.2	7.3	38.4
Tayside	4	3.0	0.5	1.3	0.3	1.3	6	3.5	0.7	2.9	0.5	2.6
Borders	1	0.7	*	*	*	*	10	5.9	0.6	2.5	0.3	1.6
South West	7	5.2	1.4	3.5	0.6	2.5	8	4.7	0.6	2.5	0.5	2.6
North East	2	1.5	*	*	*	*	8	4.7	0.7	2.9	0.5	2.6
Highlands	1	0.7	0.1	0.3	*	*	11	6.5	1.3	5.3	1.1	5.8
Total	135	100.0	39.8	100.0	23.9	100.0	170	100.0	24.4	100.0	19.0	100.0

* less than 0.1

employment, compared with only 2% in the previous period, while the Borders, North East and Highlands also increased their combined share of new jobs from about 0.5% to 10% (Table 1.2). Basically, therefore, there has been a centrifugal character to the pattern of movement, with an outward spread away from the immediate post-war core area of Clydeside into the rest of the country, with particularly heavy concentrations of new industry on the east side of Scotland stretching from Falkirk/Grangemouth into West Lothian and into Fife.

Industries have differed in the extent to which they have followed this general pattern. Table 1.3 shows this for the three dominant industries and for the three most successful regions of the 1960s. The main points of note are that after 1960 immigrant electrical engineering employment was under-represented in West Central and over-represented in East Central Scotland compared with incoming employment as a whole. Clothing industry employment was over-represented in West Central until 1965, after which the Falkirk/Stirling region proved particularly attractive. In contrast, the predominantly male employing mechanical engineering industry was the only sector to show a bias towards West Central after 1965. The number of establishments actually involved in providing this employment is too small to draw any statistically significant conclusions, so the findings need to be treated in tentative rather than definitive terms.

This shifting distribution of incoming industry also applies at the level of the individual town or city as can be illustrated by reference to the old cities and new towns. Glasgow's share of immigrant industry employment slumped after 1960 and Dundee's fell after 1951, while neither Edinburgh nor Aberdeen proved very attractive to incoming plants (Chapter 10). Consequently, after the immediate post-war period, when they obtained 33% of new plants, there was a relative move away from the cities, with a fall to about 9% in the late 1960s. Conversely, the new towns began to offer increasingly attractive alternative locations to the older cities during the 1960s, partly as a result of their increase in numbers but also partly a reflection of the development of additional facilities as they grew in size. Between 1952 and 1970 they attracted one in six of all immigrant establishments.

TABLE 1.3 THE REGIONAL LOCATIONS OF THE MAJOR IMMIGRANT INDUSTRIES IN THE MAJOR RECEPTION REGIONS

Period	Region	Industry							
		Mech Eng		Elec Eng		Clothing		All Industry	
		Employ (000)	%	Employ (000)	%	Employ (000)	%	Employ (000)	%
1945-51	W. Central	10.9	61.2	12.9	94.9	3.6	87.8	45.1	71.6
	Falkirk/ Stirling	-	-	0.1	0.7	-	-	0.1	0.2
	E. Central	0.3	1.7	0.4	2.9	-	-	1.4	2.2
	Other	6.6	37.1	0.2	1.5	0.5	12.2	16.4	26.0
	Total	17.8	100.0	13.6	100.0	4.1	100.0	63.0	100.0
1952-59	W. Central	7.1	97.3	5.1	85.0	2.6	96.3	23.0	76.9
	Falkirk/ Stirling	-	-	-	-	-	-	2.0	6.7
	E. Central	*	*	0.6	10.0	0.1	3.7	1.8	6.0
	Other	0.2	2.7	0.3	5.0	-	-	3.1	10.4
	Total	7.3	100.0	6.0	100.0	2.7	100.0	29.9	100.0
1960-65	W. Central	2.2	53.7	4.1	44.6	4.3	71.7	22.3	56.0
	Falkirk/ Stirling	0.1	2.4	-	-	*	*	0.8	2.0
	E. Central	1.6	39.0	5.0	54.3	0.9	15.0	14.7	37.0
	Other	0.2	4.9	0.1	1.1	0.8	13.3	2.0	5.0
	Total	4.1	100.0	9.2	100.0	6.0	100.0	39.8	100.0
1966-70	W. Central	0.6	54.5	2.6	32.5	2.0	33.9	9.2	37.7
	Falkirk/ Stirling	-	-	1.4	17.5	1.0	16.9	2.7	11.1
	E. Central	0.4	36.4	3.5	43.8	2.0	33.9	8.6	35.2
	Other	0.1	9.1	0.5	6.2	0.9	15.3	3.9	16.0
	Total	1.1	100.0	8.0	100.0	5.9	100.0	24.4	100.0

* less than 0.1

NB Employment is the maximum attained

1.3.3 The Structure of the Paper

This study concentrates upon the intra-regional locations within Scotland selected by incoming industry and it analyses the various factors which are hypothesised as having contributed to the changing distribution of the new locations. Part I of the paper continues by discussing the data sources and the methods of analysis to be used before considering in Chapter 3 the potential contribution of industrial location theory to explaining the evolving distribution pattern identified in Chapter 1. Traditional theory with its emphasis on transport costs is considered to be of limited analytical value, but an approach based on a variable cost model is considered to be useful, provided that it incorporates psychic costs and therefore by implication also recognises the validity of a behavioural type analytical framework. From this a number of hypotheses are formulated and these are considered in detail in Parts II and III of the paper.

Part II concentrates on the individual explanatory variables identified by both theoretical and empirical studies and incorporated within the hypotheses. No attempt is made at this stage to isolate the relative importance of the individual factors, although the conclusions of other studies are discussed. Evidence for their effect on managerial location decisions is presented in the context of firms which have moved into Scotland. Chapter 4 considers the relevance of transport costs, which are stressed by location theory, and finds evidence for their influence on intra-regional location decisions. Chapter 5 examines the impact of government policy, not in terms of its effect on the volume of movement, since this has been analysed in detail by a number of recent studies, but in the context of why firms have chosen Scotland and more particularly why they selected one area in preference to another. The analysis proceeds to labour supply, which has been identified in empirical studies as a major location factor at the inter-regional level. Chapter 6 discusses its relevance to location choice within Scotland and considers whether changes in the industrial structure of incoming industry have had an impact on the demand for a particular type of labour. The importance of an available site or factory to mobile industry is the subject of Chapter 7. Changes in the spatial distribution of

these resources are identified and advance factories are shown to have become valuable inducements to immigrant industry. Chapter 8 examines evidence for the growing importance of non-economic factors in location decision making and these can be affected by the activities of local authorities, which are the subject of Chapter 9. The final two chapters are devoted to the changing attitudes towards a location in the older cities, in Chapter 10, and the new towns, in Chapter 11. Possible reasons for changes in their relative attractiveness are discussed.

Finally in Part III these individual factors are brought together as potential explanatory variables in a statistical analysis based on multiple regression techniques. This has basically two functions, being concerned with trying to assess whether or not the major influences on location decision making at the intra-regional scale within Scotland have been incorporated within the analysis, as well as assessing the relative importance of each factor when considered in conjunction with all the others. In this way it is possible to show how their individual influences have fluctuated over time and with them the relative attractiveness of different competing areas. Finally an attempt is made to explain the changing location pattern of incoming industry in terms of changes in the relative cost advantages of individual areas.

CHAPTER 2

DEFINITIONS AND DATA

Research concerned with industrial mobility is heavily dependent on data maintained by the Department of Industry (Howard, 1968) and this has formed the basis for most interview and statistical studies (Cameron and Clark, 1966; ILAG, 1973; Keeble, 1972; Sant, 1975). For the purpose of this study the basic data source was information kindly provided by the Economics and Research Section of the Department of Industry in Glasgow[1], who keep amongst their records information on every immigrant manufacturing plant in Scotland. The Department define an immigrant as a new manufacturing establishment set up by a firm which did not manufacture in Scotland prior to 1945 and to which a non-Scottish manufacturing origin can be attributed. At some time in its history the establishment must have employed eleven or more people in order to be included in the record. The definition of immigrant therefore excludes companies new to manufacturing, take-overs of local plants by non-Scottish companies and new branches set up by externally owned firms which manufactured in Scotland before 1945, such as, for example, Rolls Royce.

The Department of Industry's Office for Scotland produce a list of immigrant firms which have come to Scotland since the war and they have supplemented this with additional information. Unfortunately,

[1] Now part of the Scottish Economic Planning Department.

however, they are unable to provide detailed employment breakdowns for cross-tabulations where there is a danger of disclosing figures for individual establishments, since this would infringe the 1947 Statistics of Trade Act. Because data for individual establishments was required for this project it has been necessary to use alternative sources for employment information. The most important of these is the Glasgow University Record of Industrial Establishments (GURIE), which contains establishment based data for manufacturing plants in the Clydeside conurbation. This was supplemented by other establishment based information which is held in the Department of Social and Economic Research at Glasgow University and has been generated over the years by various research projects.

In addition, employment information on the new towns was kindly made available by Mr R Steele, a Canadian post-graduate geography research student, who is undertaking a research project on employment structure and growth in the Scottish new towns. Further employment gaps were filled in with the assistance of the Scottish Council Information Bank, local authorities, newspaper information and the firms themselves. As a result of the difference in sources the employment figures produced here are likely to differ from those made available by the Department of Industry in Scotland.

As well as employment data, the industry order (SIC), year of opening, origin and employment of each establishment, together with information on the type of site and factory occupied were put on to a computer file held by the Scottish Universities Regional Computer Centre in Edinburgh. Data on sites and factories was culled from a range of sources, of which the most important were the Scottish Industrial Estates Corporation[2], the Department of Industry's Office for Scotland, the New Town Development Corporations and local authorities.

From the data bank, detailed changes in the structure and location of immigrant plants have been identified and correlated with changes in a variety of variables which are hypothesised as possible

[2] Now part of the Scottish Development Agency

influences on the location decision. The analysis has been concerned with three spatial levels: the Scottish planning region; city or county; and (on occasions) individual employment exchanges or groups of exchanges.

Inevitably in a project of this type subjective judgment is necessary in deciding both how to measure the particular variables hypothesised as being relevant, and also the particular year to take the measurement. It seems desirable, therefore, to discuss some of the decisions which were made.

A basic assumption is that in order to identify changes over time it is valid to divide the study period into four sub-periods: ie 1945-51; 1952-59; 1960-65; and 1966-70. This basically follows the precedent set by Howard (1968) in his analysis of UK post-war industrial movement. The periods were differentiated mainly by changes in government regional policy and this project has added a further period (1966-70) to those used by Howard. This period coincides with a yet more active policy, as heralded by the 1966 Industrial Development Act and it ends before the extension in both spatial coverage and the incentives available which occurred with the 1971 legislation. It also precedes the influx of oil related employment into Scotland which adds a new dimension to the immigrant industry scene, especially as some of the major projects, such as production platform sites, are distinctive in that the overriding locational consideration was the availability of a coastal site. The sheer size of these establishments will affect the employment figures and make a meaningful correlation analysis highly unlikely.

The spatial sub-divisions are also important since they determine the geographical scale at which the results will apply. The objective has been stated as examining location decisions at the intra-regional level and it is necessary to concentrate on smaller spatial scales than previous studies concerned with the wider UK context. Ideally the level of the employment exchange or travel to work areas would have been most suitable, but there are two severe drawbacks from the point of view of this study. Firstly, there would be a large number of zero observations, especially in the early periods when incoming industry was concentrated in

only a few areas. Secondly, there is a problem of fitting Census of Population data to employment exchange boundaries. As a result of these difficulties it has been decided to undertake the analysis at the level of the individual cities and counties, or, in the case of some of the smaller ones, a group of adjacent counties. This has two advantages, because Census of Population data is readily available at this scale and in the vast majority of cases travel to work areas, based on groups of employment exchanges, coincide with county boundaries or else extend beyond them into sparsely populated areas, which for analytical purposes can be overlooked. The twenty-three areas upon which the statistical analysis is based are shown in Table 2.1.

Immigrant employment has been measured at three dates: the end of the period in which the establishment started production; at its maximum total; and at 1970. The end of period figure was selected to represent employment in the initial growth period, whereas the 1970 figure indicated the extent of subsequent expansion or decline. The former figure is biased towards those plants which set up early in the period concerned and therefore have had longer to build up (except in the 1966-70 period), whereas the latter includes firms whose employment has shrunk well below a previous peak. Both figures exclude closures which occurred before the relevant terminal year. By contrast, the figure for maximum employment that can be attributable to immigrant plants. However, the year of peak employment varies from plant to plant so that resources released by a contraction in one immigrant may be re-utilised by expansion in another one, and the maximum figure does not refer to employment at any one moment in time.

Unemployment figures have also been taken for selected years in each period, usually towards the start of the period concerned; ie in 1948, 1954, 1963 and 1966. The first two years were also used by Keeble (1972) in his statistical study of industrial movement. The year 1963, which is in the middle of the 1960-65 period, was taken because it was a time of very high unemployment and influenced the Government's decision to strengthen regional policy through the Local Employment Act of 1963. In addition, this year saw the extension of Development

TABLE 2.1 THE COUNTY GROUPINGS USED FOR THE STATISTICAL ANALYSIS

1. Glasgow city
2. Lanarkshire
3. Dunbartonshire
4. Renfrewshire
5. Ayrshire
6. Stirlingshire
7. West Lothian
8. Midlothian
9. East Lothian
10. Edinburgh city
11. Fife/Kinross
12. Roxburgh/Selkirk/Peebles/Berwickshire
13. Dumfriesshire
14. Wigtownshire/Kirkcudbrightshire
15. Perthshire
16. Dundee city
17. Angus
18. Aberdeenshire/Kincardineshire
19. Aberdeen city
20. Banff/Moray/Nairn
21. Argyll
22. Inverness-shire/Ross-shire
23. Caithness/Sutherland

District status to areas in Fife and south Stirlingshire which were able to take advantage of their increased attractiveness to mobile industry. In fact the Development Districts remained virtually unchanged in area from 1963 until the 1966 Industrial Development Act.

Census of Population data was used to try and obtain a measure of the physical image of an area, in terms of the quality of its housing stock. Whether or not this is a satisfactory surrogate is debatable and requires further work. Ideally, it would be preferable to undertake a principal components analysis on a wide range of variables thought to be relevant to an area's image and then areas would be classified on the basis of their factor scores.

CHAPTER 3

INDUSTRIAL LOCATION THEORY AND HYPOTHESES FORMULATION

The complex array of factors influencing location decisions has prevented the formulation of any single comprehensive theory of industrial location. Difficulties arise in identifying all the relevant variables, the way they exert an influence and their relative importance. There are also uncertainties over the goals of decision makers and the influence of non-economic factors. Nevertheless a theoretical underpinning is necessary to assist and strengthen empirical analysis because it provides the basis for hypothesis formulation. There are essentially three principal theoretical approaches which have been used in industrial location theory. The first two assume that decision makers seek to maximise profits so that the optimum location is where total revenue exceeds total costs by the largest amount. This means that both supply (cost) factors and demand (revenue) factors need to be considered as both can vary spatially. However, it is difficult to identify the effect of each without making simplistic assumptions which involve holding either supply or demand factors constant over space. There has also been much debate over the validity of the profit maximising assumption and this has led to the development of non-optimising behavioural theories of industrial location. These three strands of location theory are each considered in turn by examining some of the ideas of the principal contributors.

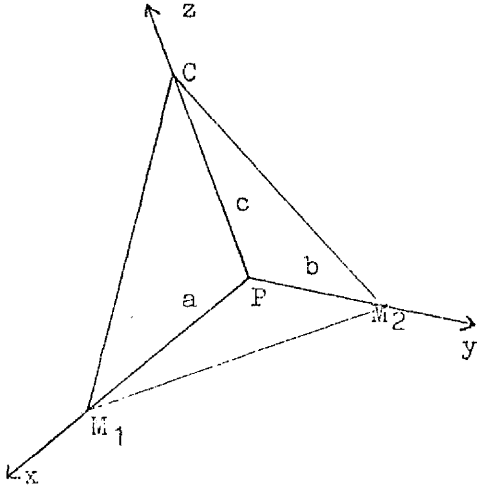
3.1 LEAST COST LOCATION THEORIES

3.1.1 The Contribution of Weber

The first major contribution to industrial location theory was made by Weber in 1909 and although it has several theoretical and practical weaknesses it is a valuable starting point.

Weber made three basic simplifying assumptions in his theory explaining the location of a new plant. Firstly, the location of inputs is given; secondly, the market is seen as a set of given points and is not evenly distributed over space; thirdly, labour is found only at selected locations where supply is unlimited at a given wage. Perfect competition is assumed with no producer able to influence the market.

Although transport costs, labour costs and agglomeration factors were held to dominate the location decision, transport costs were seen to be the most important. The basic issue considered by Weber is where to locate production given the location of raw materials and the market. He considers this by means of his familiar locational triangle, which has as its three points the market and two raw material sources (Fig 3.1). The optimum location is identified as the one where total transport costs are minimised since he assumes that production costs are constant over space. Costs are viewed as a function of the weight both of raw materials to be moved to the production site and of finished goods to be carried to the market, as well as of distance. They are measured in ton-miles (weight x distance).



$M_1 + M_2$ = source of materials
C = market
P = least cost production point
a + b = distance over which materials have to be moved
c = distance over which finished product has to move
x + y = weight of materials needed per unit of output
z = weight of unit output

Fig 3.1 Weber's Location Triangle

Weber went on to identify material or market orientated industries by means of a locational weight index, which expresses the ratio of the weight of materials to that of the finished product. If the weight of localised materials used exceeds that of the finished product the firm should locate at the material source, but if the reverse occurs it should locate at the market. In order to make the theory more realistic, costs rather than weight per mile need to be considered and Weber recognised this by introducing the concept of ideal weight, which is a function of actual weight and transport rates. Typical examples of material orientated industries, where costs of moving the raw materials exceed those of the output are metal manufacture, bricks and cement, pulp and paper and food products. Conversely, examples of industries where the latter costs are higher, resulting in a market orientated location, are bread-making, brewing, ice and glass production and oil refining.

Weber went on to relax the assumption of spatially uniform production costs, but then only applied this in the case of labour costs. He argued that where labour is relatively cheap a firm will be attracted to the area if the saving in labour costs exceeds the marginal increase in transport costs. He illustrated this by means of isodapanes, which are lines drawn around the minimum transport cost location and which join places of equal additional transport costs. The isodapane within which the savings in labour cost equal the additional costs of transport, enabling one to be substituted for the other, is termed the critical isodapane (Fig 3.2).

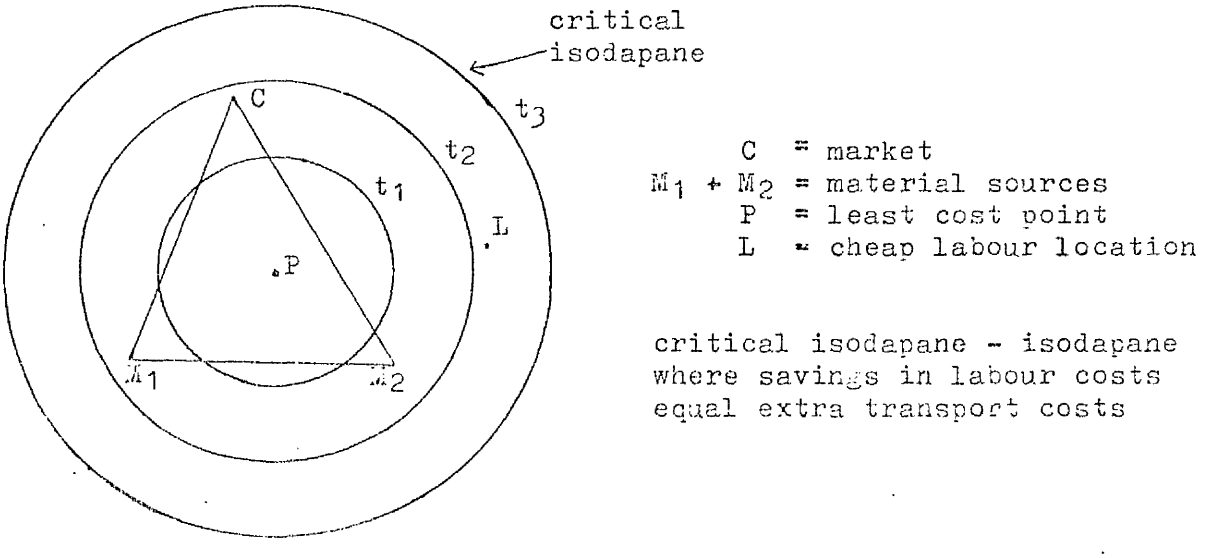


Fig 3.2 Critical Isodapane

Weber also suggests that agglomeration economies could act in a similar way to divert a firm from the point of minimum transport cost, if the savings in cost offset the additional transport costs. This is illustrated in Fig 3.3, where three firms are located at their minimum transport cost location at A, B and C respectively. These firms will only move together to a new location if all their critical isodapanes intersect, indicating that they will all gain a financial advantage from moving. In Fig 3.3, where the critical isodapanes are shown, each firm's costs will be reduced by moving to the shaded area. This approach has been criticised by Palander, who argues that firms will only move to gain agglomeration economies if they are certain that the other firms will do the same. Since this cannot be guaranteed, the value of this concept as expressed by Weber is suspect.

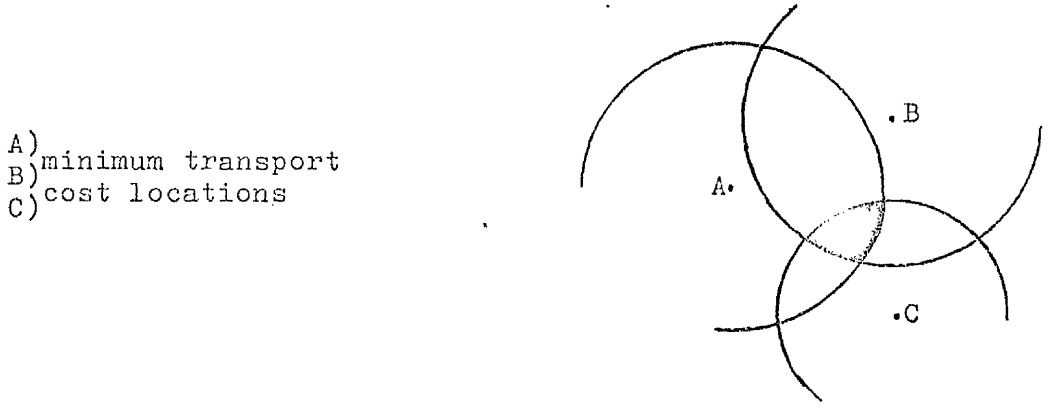


Fig 3.3 Critical Isodapanes and Agglomeration Economies
Source: Smith (1971)

In fact Weber's theory has given rise to a great deal of criticism attacking his simplifying assumptions [McCrone (1969); Richardson (1969); Smith (1971)]. The more important weaknesses pointed out by later theorists are discussed in the following sections, where subsequent modifications and improvements to the original theory are discussed. Nonetheless Weber's work has provided a number of useful insights into industrial location decisions and has provided the starting point for much additional work in this field. Smith (1971) has argued that the model can be fairly easily modified to provide a more general variable cost theory and this is considered in more detail below.

3.1.2 The Contribution of Palander (1935)

Palander made the next important contribution in 1935, when he dealt with two basic issues. Firstly, where to locate a factory given the location and price of materials and the position of the market, and secondly, the effect of price on the size of the market area. Weber was concerned only with the first of these, although Palander introduced greater realism into the theory by recognising the existence of tapering freight rates.

Palander argued that price is a function of production costs and transport costs. The market area is delimited by those places where customers are indifferent as to which producer they buy from, since they are able to purchase products at the same delivered price from rival firms. Total profits are held to be dependent on the size of the market area, which in turn depends on the location of competing firms, their relative production costs and transport costs. By introducing the concept of spatial competition into the model, Palander shows that by reducing either production or freight costs a firm will be able to enlarge its market area, but at the expense of its competitors. In Fig 3.4, B enlarges its market area at the expense of producer A by obtaining lower freight rates which result in a lower delivered price.

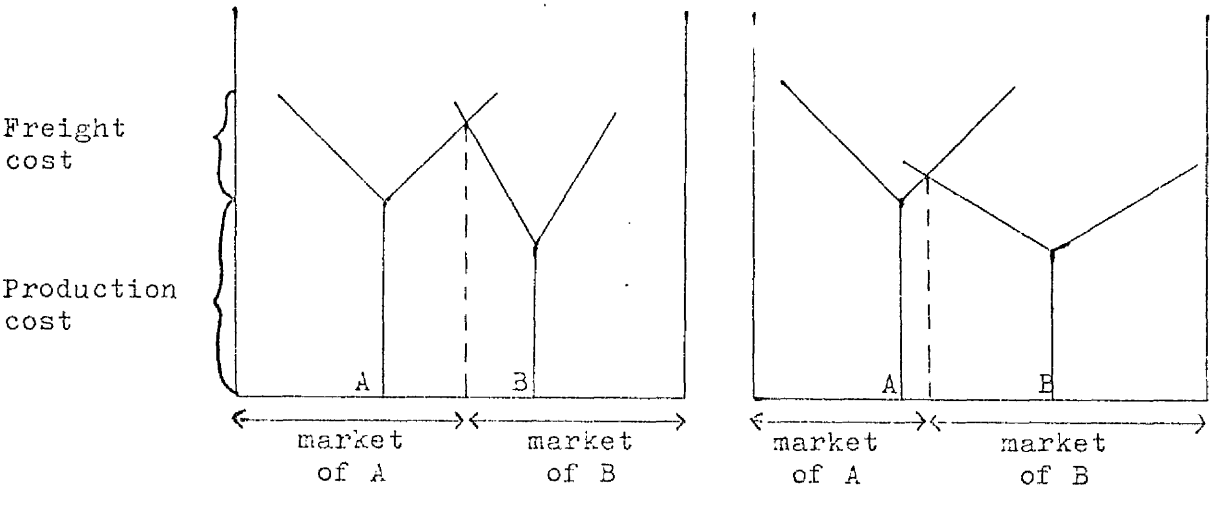


Fig 3.4 The Extension of a Market Area by Lowering Freight Costs
Source: Smith (1971)

3.1.3 The Contribution of Hoover (1937, 1948)

Hoover's approach is also basically a cost minimising rather than revenue maximising model and he initially follows Weber in arguing that the optimum location will be the point of minimum transport costs. However, Hoover proceeds to make several important modifications to and improvements upon Weber's theory by rendering it more realistic.

Hoover, as with Palander, recognised that transport costs are more complex than suggested by Weber and that this has implications for the location decision. He adopted a more realistic attitude by accepting that transport costs are not directly proportional to distance. He also preferred to use the term transfer, rather than transport, costs since the costs of movement are not fully expressed by the freight rate because other additional indirect costs have to be met such as insurance, interest charges, clerical costs, and those incurred by deterioration, loss or damage in transit.

Since terminal and other indirect charges occur regardless of the distance of movement, the transfer charge will rise less than proportionately to distance because such charges represent a smaller share of total transfer costs as distances increase. In practice rates tend to rise in a series of steps, each being successively longer and shallower than the previous one. In addition there are a variety of other elements that affect transfer costs. Competition between alternative methods of transport will depress freight rates on certain routes, as will the prospect of return loads or the guarantee of regular large loads. The nature of the product being moved can also affect the situation, with higher rates charged where specialised requirements have to be met, such as purpose built containers (for liquids or refrigerated goods) or careful handling (for fragile or valuable loads) or rapid movement (for perishable goods). Hoover also recognised that transport is not equally feasible in all directions, so that lines of equal transport cost will extend radially along the main routes.

These considerations have important ramifications for the location decision because Hoover, following Palander, showed that the

relaxation of the assumption of transfer costs proportional to distance results in a greater probability of a location either at the source of materials or at the market, rather than at an intermediate point. If the latter is chosen, Hoover suggests that it is likely to reflect a lower production cost, such as low wages, rather than a transport orientation, unless it happens to be a break of bulk or trans-shipment point.

Hoover also adopts a more realistic approach than Weber towards production costs. Weber only relaxes the assumption of spatially uniform production costs in the case of a cheap labour location or possibly of agglomeration cost advantages. Hoover considers external economies in much more detail, regarding them as part of production costs. He recognises localisation economies, which are external to the firm but internal to the industry. Examples are labour skilled in the industry's requirements, specialist suppliers and services such as repair and maintenance, technical education, finance, and research and development orientated to the industry's needs. He also discussed economies of urban concentration which are external to the industry and benefit all firms in the area. These include access to both a large market and labour supply, presence of a wide range of business and commercial services, extensive transport linkages and good social, educational and recreational facilities. The firm is saved the cost of internalising these services which might be necessary at the minimum transport cost location.

Hoover also realised that production costs could vary with the level of output. Internal economies of scale lead to a falling marginal cost of production and enable a producer to extend his market area if the rate of decrease exceeds the marginal increase in transport costs which arise from serving a larger market. This may squeeze out the smaller higher cost producers, who were formerly able to compete in areas of relatively high delivered prices. Hoover shows how different sectors of the market will be served by locations with different production costs, something not considered by Weber (Fig 3.5). The market area boundaries are determined by the points of equal delivered price from each producer.

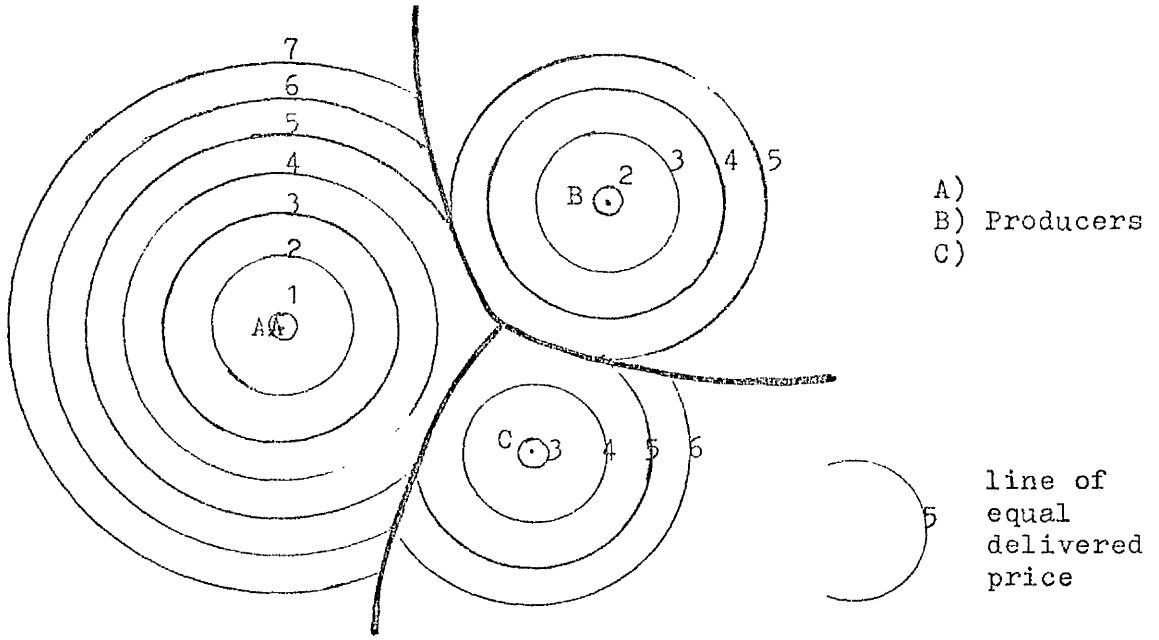


Fig 3.5 Market Areas Delimited by Points of Equal Delivered Price
Source: Smith (1971)

Although Hoover refers to market areas and suggests ways of identifying their spatial extent, including changes in their size as delivered price changes, his prime concern is with cost rather than demand factors. Costs of movement, in this case transfer rather than simple transport costs, remain the main explanatory variable of location decisions.

3.2 MARKET AREA THEORIES

Classical least cost theory is rooted in Weber's work and includes much of both Palander and Hoover. The basic assumption is that demand is spatially constant and locational interdependence or the activities of other firms are ignored. When this assumption is relaxed the least cost location does not necessarily yield maximum profits, since the sales potential may be far higher elsewhere. To try and overcome this drawback a number of theories have been developed which concentrate almost exclusively on demand factors.

They assume imperfect or monopolistic competition with spatially uniform production costs but demand widely scattered. Profits are therefore maximised where sales and revenue are greatest and a firm will seek to control the maximum possible market area within

which it has a monopoly selling at a lower price than its competitors. Costs to consumers equal production costs (constant) plus transport costs (variable) so that the market area will be defined by the points where consumers can buy more cheaply from producers in other locations. Thus plant location is seen as a function of spatial variations in demand and the location of rival producers. Unfortunately by ignoring spatial differences in production costs these theories go to the opposite extreme of the least cost theories and are equally, if not more, unrealistic.

3.2.1 The Contribution of Hotelling (1929) and Chamberlain (1936)

Hotelling and Chamberlain made important early contributions to a market area analysis of location decisions and these were later elaborated and extended by Lösch (1954). Hotelling showed how equilibrium would be reached in a linear market with inelastic demand, citing the now well-known example of two ice-cream sellers on a beach. He concluded that firms would agglomerate together in the centre of the market (Fig 3.6b) since a location anywhere else, such as B in Fig 3.6a would lose the firm concerned sales to its competitor. Agglomeration is therefore viewed as an important locational factor, even in the absence of both external economies of scale, such as were discussed by Hoover, and of spatial variations in costs, such as Weber tentatively considered.

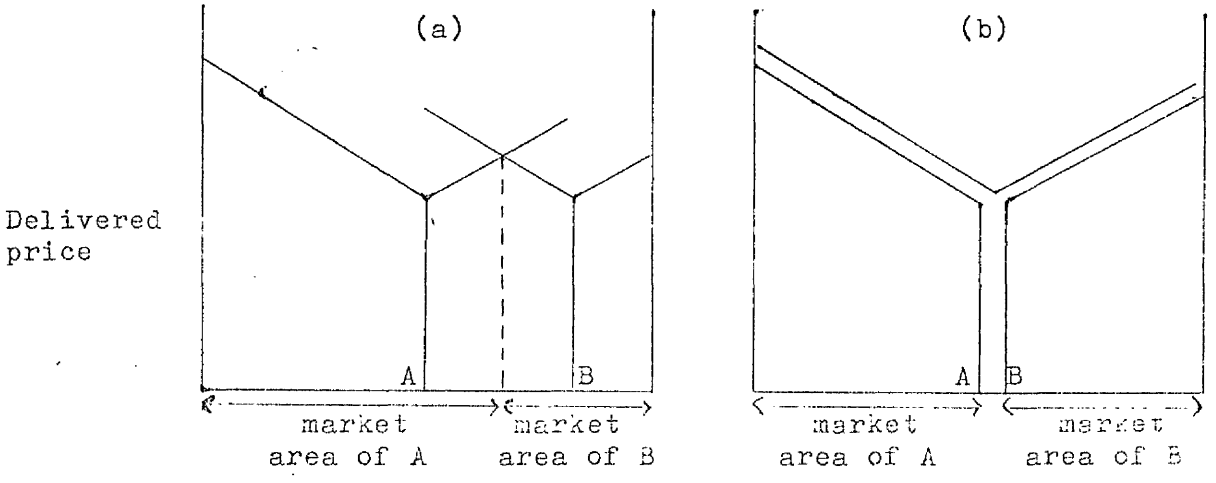


Fig 3.6 Agglomeration Pressures

Source: Smith (1971)

This argument has been criticised by Chamberlain (amongst others) who has argued that agglomeration is in fact far from certain. Two firms can share the market equally without occupying the centre of the market, provided they are equidistant from the centre. If an additional firm enters the market, dispersal will occur, since the firm in the middle will find its sales area squeezed by the other two and it will move to a new location offering a larger share of the market. Under conditions of elastic demand it becomes necessary to keep transport costs to a minimum to increase sales and even if there are only two firms they are likely to disperse and locate at the quartiles.

3.2.2 The Contribution of Lösch (1940, 1954)

Lösch developed the first major location theory that had demand as the principal spatial variable. He argued that the optimum location is where revenue is maximised and, in order to evolve a manageable theory, production costs were held constant. This arose from his assumption of a homogeneous plain, with an even distribution of both raw materials and of population and uniform transport rates in all directions.

Costs vary simply as a result of transport rates, and increase proportionately with distance from the point of production. Assuming that demand is elastic there will be a price level where demand falls to zero, when consumers decide they obtain insufficient utility to justify the cost or else they can produce the product for the same cost themselves. This results initially in a circular market area, but this is modified by competition to a hexagonal shape as new producers continue to start production until the whole area is served and excess profits are eliminated. At the boundaries of the market areas consumers will be indifferent as to the producer they buy from, since prices will be equal, as both Hoover and Palander also assumed. A hexagonal shaped market area is the most efficient since it maximises demand per unit area while minimising total transport costs. Lösch also introduces a dynamic element into his analysis by examining the effect of raising the production costs of a particular factory upon its

market area (Fig 3.7). In Fig 3.7b, firm A loses its market completely to B as a result of a large rise in production costs.

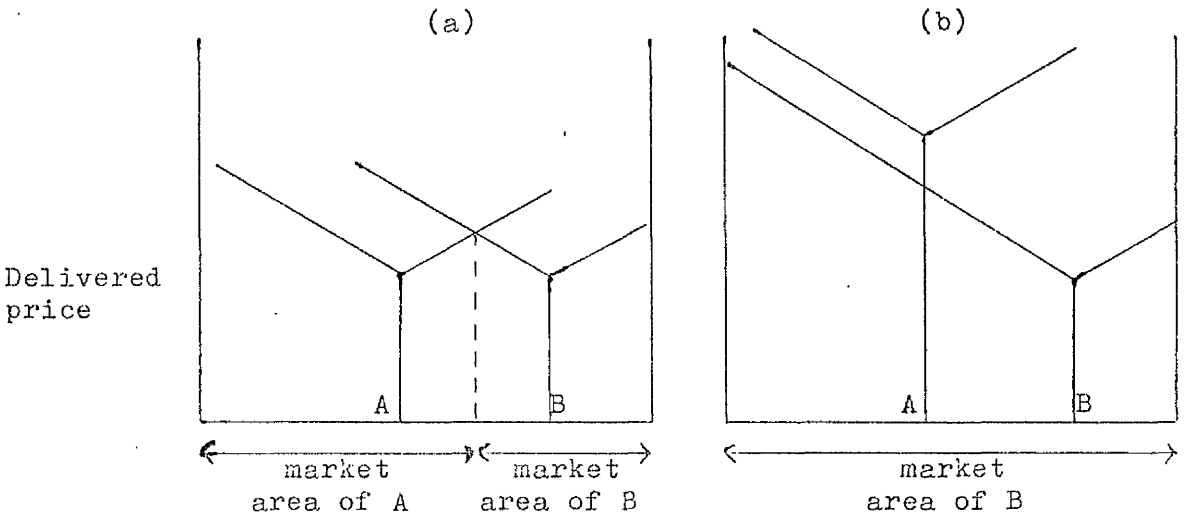


Fig 3.7 The Effect of an Increase in Production Costs on a Firm's Market Area

Lösch recognised that there will be a hierarchy of market areas, varying in size from product to product and he assumed that each type of market area has at least one production centre in common and this is where the largest city develops. By rotating the market areas Lösch showed it is possible to produce six sectors with many potential production sites and enjoying external economies, and six sectors with few suitable sites.

This model has many weaknesses, and as numerous writers have pointed out this greatly reduces its practical application [McCrone (1969); Richardson (1969); Smith (1971)]. In reality resources are not evenly distributed and production costs are not uniform over space. As with the least cost theories of Weber and others, there is excessive reliance on transport costs as the determinant of location. Furthermore demand is not spatially uniform and a large market may be able to provide economies of scale for several producers without their need to locate within separate market areas. In practice there are few instances of industries where the firms have a monopoly within their own sales areas, although possible examples are local newspapers and bread making. The theory also ignores agglomeration economies, which

cause firms to locate together to reduce costs, although Lösch was aware of such tendencies in his identification of sectors rich and poor in sites. As a result of these weaknesses the theory is only of limited value for the analysis of a few market orientated manufacturing activities, but it probably has more relevance for the service sector.

3.2.3 The Contribution of Greenhut (1956)

In 1956 Greenhut made the first significant attempt to integrate least cost and market area theories by including both cost and demand considerations. He distinguished several types of location factor, notably transport costs, processing costs, demand factors, cost reducing and revenue increasing factors.

He follows previous location theorists in considering transport costs to be an important influence on the choice of location, but he criticises the lack of a clear distinction in location studies between market and transport cost considerations. He claims that explanations of a market orientation in reality often simply reflect a location designed to reduce transport costs and the decision is really made on cost saving rather than revenue increasing grounds. Greenhut stresses the need to differentiate between a market location attributable to market advantages, such as its actual or potential size and proximity to customers, or to a saving in transport costs.

He felt that the most significant processing costs were labour, capital and taxation, which will be important where neither transport costs nor demand considerations dictate a location at the source of inputs or market. Particular attention is devoted to demand factors and he argues that production will become more dispersed as either elasticity of demand or transport costs to market increase.

Greenhut argues that the type of expansion being considered by an industrialist is important and that different locational factors will be considered by an industrialist when deciding in which area

to locate a new branch plant, as opposed to deciding between a branch plant in a new location and an in situ expansion. He claims that most firms have several markets and the most attractive will be the one with the greatest total demand for the products of the new plant. This may not be the largest market in terms of overall aggregate demand, but will be from the point of view of the new plant.

Greenhut also felt that agglomeration economies can be seen either as cost reducing, such as access to specialist suppliers, or revenue increasing, as a result of close contact with potential markets. He also makes a significant contribution when he recognises the existence of uncertainty and the importance of personal considerations in the location decision and this is considered further in the discussion of behavioural theories.

Smith (1971) has suggested that the comprehensive nature of Greenhut's theory makes it one of the most useful general statements on industrial location, although the approach tends to concentrate on demand at the expense of supply factors. This, it is argued, reduces its value for analysing location decisions, at least in the UK context.

3.2.4 The Contribution of Isard (1956, 1960)

Isard (1956, 1960) sought to integrate location theory with general economic theory and stressed the importance of the substitution principle to both. Like earlier theorists he places great weight on transport considerations, and emphasises their crucial role to both production and consumption. He showed how transport inputs could be viewed within a substitution framework with one source of inputs being substituted for another. Isard also examined how the movement of a firm from the lowest transport cost location to a site with cheap labour or agglomeration cost advantages will involve substituting cheaper production costs for higher transport costs. When deciding upon a new location a firm is likely to substitute plentiful low cost factors for scarce high

cost ones. Consequently some parts of the market will be served from market orientated sites and other by sites with cheap labour or material inputs.

Isard has also argued that the regular pattern of hexagonal market areas suggested by Lösch is unlikely to occur in practice. He showed graphically that because of the high density of population in metropolitan areas, the size of the market areas will be smaller, but will increase as density falls away from the major nodal centres. Isard, unlike Lösch, recognised the importance of agglomeration economies and showed that it is impossible to retain hexagonal market areas if such economies are allowed for.

3.3 BEHAVIOURAL THEORIES

The classical location theories have been heavily criticised for making unrealistic assumptions about the real world because they assume that firms choose among fixed and known alternatives, to each of which is attached known consequences (Simon, 1959). Such theories are based on the actions of rational "economic man", who is assumed to be a profit maximiser, possessing complete information and perfect knowledge of alternative courses of action. Risk and uncertainty are assumed away, although Lösch (1954) did recognise that "dynamically there is no best location because we cannot know the future". In reality industrialists do not act in the rational manner of "economic man" for very good reasons, and Simon (1959) has pointed out that "when perception and cognition intervene between the decision maker and his objective environment, this model no longer proves adequate".

Furthermore, Simon (1959) has even drawn attention to a logical inconsistency in the basic assumption, arguing that "the central difficulty is that rationality requires one to outguess one's opponents, but not to be outguessed by them, and this is clearly not a consistent requirement if applied to all the actors". The inability to predict the actions of others under conditions of imperfect competition is a serious flaw in the classical models.

Simon (1959) sought to develop a more realistic behavioural approach to location decisions by introducing the concepts of bounded rationality and satisficing behaviour. He argued that firms operate in a complex economic environment where alternatives are not given, but have to be actively sought. The real world is too complicated to comprehend fully, so that maximising theories seeking an optimum location have little relevance to decision making. Decisions are based on perceptions of, and responses to, the subjective environment which is a simplified version of reality, rather than the objective environment in which the decision maker actually lives. Consequently decision makers may behave rationally in respect of the perceived reality, which Simon terms "bounded rationality", but their actions may not be optimal in the context of the real world.

Simon argues that business goals are formulated in adaptive and satisficing terms and that problem solving is based on meeting certain aspiration levels rather than searching for the best alternatives in terms of specified criteria. Aspirations tend to adjust until goals reach practically attainable levels and, according to Simon, when "the firm has alternatives open to it that are at or above its aspiration level, the theory predicts that it will choose the best of those known to be available".

Pred (1967) has followed Simon's view that decision makers tend to be satisficers rather than optimisers and has argued that location decisions are taken against a background of variation in both information and the ability to use it. As both diminish so the probability grows that the location will be markedly different from the economic optimum. According to Pred "the apparently chaotic qualities of the spatial distribution of most manufacturing production at any one date is ascribable to the fact that the real world is populated by a broad spectrum of bounded, rational, satisficing locational actors and not by undifferentiated profit maximisers".

Recent empirical work has provided abundant evidence that the concept of industrialists acting in the likeness of rational economic man is unrealistic. Galbraith (1967) has argued that even large

corporations whose management might be thought to be less swayed by non-economic considerations may not necessarily be profit maximisers, preferring instead to maximise market share or turnover and possibly seeking security by minimising risks and controversial decisions. This latter consideration may explain a preference to locate new plants close to established industrial centres, where the potential error costs, as well as profits, may be lower than in an untried location.

A number of extremely useful contributions to an understanding of industrial decision making have been made in recent years by Townroe (1969, 1971). He sees the decision as a management problem directly connected with the problems of investment planning. Townroe feels the decision needs to be seen within the context of the organisational structure of the firm and the motives and goals of the decision makers. In a study of the decisions made by fifty-nine firms setting up new plants in the West Midlands and North East of England, Townroe found there was little evidence of the theoretical rational economic behaviour. The non-routine nature of the location problem and the lack of personal experience led to a great deal of uncertainty for management, who are faced by imperfect knowledge, partial and biased information, the cost of data collection, doubts about the correct time horizon to plan for and about future costs and revenues.

Under such circumstances, it is hardly surprising that there is an absence of both a systematic approach and of clearly defined objectives, but an abundance of opportunities for an impressionistic assessment. Such uncertainties and the higher priority frequently accorded to the non-locational aspects of the investment decision result in companies selecting the first location that matches their aspiration levels, resulting, as Simon argued, in the choice of a satisfactory, rather than the elusive optimum, site. Townroe found that only 36% of his sample made any attempt to cost different locations and he concluded that "for a majority of companies alternative locations are not evaluated on explicit cost grounds and the financial assessment comes after the locational choice". This appears to support Richardson's (1969) suggestion that "firms, in full recognition of the unpredictability of future changes in spatial costs and prices and

the difficulties of measuring external economies, will not go to extreme lengths to find the most profitable location, but instead will opt for a location that seems viable in the long run and rely on increasing efficiency in other respects to raise their profitability".

It is possible to view a satisficing solution as equating with the maximising of utility by means of the concept of "psychic income", which was introduced by Greenhut (1956) to express the non-financial benefits obtainable by an industrialist from a particular location. He argues that the optimum location is the one where total satisfaction, in the shape of both financial and psychic income, is maximised. Personal attractions to a particular area, as expressed by its "psychic income" may be sufficient to outweigh the profit advantage of an alternative location. This concept is difficult to handle within the traditional theoretical context with its emphasis on the least cost or maximum revenue location, although Smith (1966) has suggested that it is possible to incorporate satisficing behaviour by utilising the framework of his space cost curves. Townroe (1971) has shown that in reality personal considerations can have a strong bearing on the location decision. His study found that nearly half of the companies paid some attention to their staff's wishes and considered the general amenities and facilities of the short listed areas. In so doing "these companies explicitly allowed personal feelings to become a part of the input to the final choice".

3.4 SYNTHESISING THESE THEORIES - A VARIABLE COST MODEL

3.4.1 The Contribution of Smith (1966, 1971)

Smith (1966, 1971) argued that many of the major theoretical statements have very limited scope in terms of their practical application, but he suggests that it is possible to overcome the two main weaknesses of classical theories, namely the concentration on transport costs and the preoccupation with identifying an optimum location. He proposes two basic modifications to the least cost model. Firstly, the substitution of total costs for transport

costs. Secondly, the use of the concept of spatial margins to profitability, which was originally introduced by Rawstron (1958). Smith extends this idea by identifying the margins by means of space cost curves, which represent the average cost of a unit of production at any point in space, and rise away from the least cost location.

Smith's model offers a number of valuable concepts for analyses and his approach is closely followed in this study, since his claim seems valid that "the great advantage of the total cost view is that only in this kind of model can revenue be inserted to show spatial margins to profitability, as well as an optimum location. This is impossible in an isodapane model where the locational costs of some inputs, such as labour, are not included" (Smith, 1971). A valuable feature of this model is that it reveals not only the optimum location at which profits may be maximised, but also spatial margins beyond which profitable operation is not possible. Within these margins profits can be made and the firm is free to locate anywhere, providing it is not seeking to maximise its profits. This enables the model to incorporate sub-optimal behaviour.

Smith goes on to suggest that a useful distinction can be made between basic and locational costs. The former represent the minimum cost at which the input can be obtained anywhere, while the latter is the marginal cost incurred in utilising an input away from its cheapest location. Since basic costs are spatially constant the least cost location is where locational costs are minimised. Both the relative importance of an input in a firm's cost structure and its spatial variations in cost will be important to the location decision. The larger both of these are, the greater their influence on variations in total cost and on comparative locational advantage.

Smith's initial simplifying assumptions are that firms seek to make a profit, but not necessarily the maximum one, and they have some, but not necessarily perfect, knowledge about spatial differences in costs and revenue. There are no barriers to the entry of new firms into the industry and location decisions are independent of the location of other producers, apart from the

extent to which they are reflected in the prevailing cost of inputs. Sources of inputs are fixed, their supply is unlimited and they are mobile, being obtained at a price equal to basic plus location costs. None of these assumptions is subsequently relaxed, unlike the ones which follow.

Demand is held to be spatially constant with no price advantages in alternative locations. The model applies to a single point in time, so that price, input costs and technology cannot change. All entrepreneurs are of equal ability, there are no agglomeration economies, no factor substitution and no economies of scale since all firms produce the same level of output. Finally the location decision is not affected by personal considerations. The effect of modifying some of these assumptions is illustrated later when the importance of particular locational factors is considered in detail.

In this model total costs are a function of the sum of the basic and locational costs of each quantity of inputs required for a unit of output. The least cost location is the place where total costs are minimised and since total revenue is spatially constant this location is also the one of maximum profits. The spatial margins to profitability are delimited by the points where total revenue equals total costs.

Smith shows how the model can be applied by means of notional cost and distance figures applied to three inputs. This enables him to derive cost isolines for each input and a total cost surface is derived from the sum of the individual isolines. He also illustrates these concepts in graphical form, as shown in Fig 3.8, where average total costs rise away from point O, until at M_1 and M_2 they equal average revenue, which is constant over space. Beyond these spatial margins losses will be incurred and so locations there will be avoided.

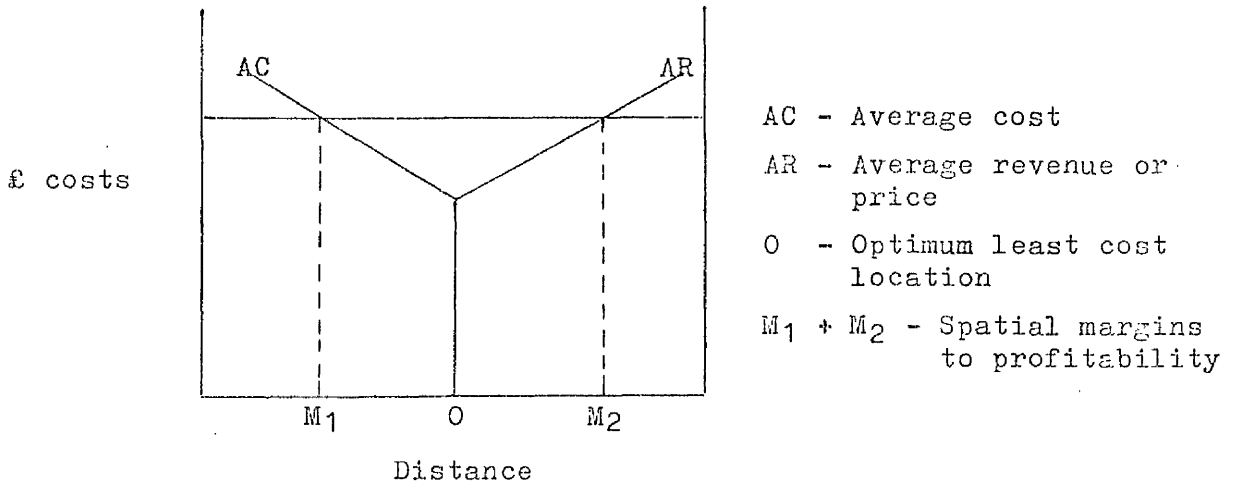


Fig 3.8 Space Cost Curve Optimum Location and Spatial Profit Margins
Source: Smith (1966)

Smith recognises that in reality demand, and therefore revenue, vary over space and can be influenced by a plant's location. He proceeds to relax the assumption of revenue being spatially constant, so that the maximum profit point will be where average revenue exceeds average costs by the greatest amount. This is shown in Fig 3.9, where average cost increases away from A, but revenue falls with distance from B, where demand is maximised. In practice the maximum profit location is not necessarily at either the maximum revenue or least cost location.

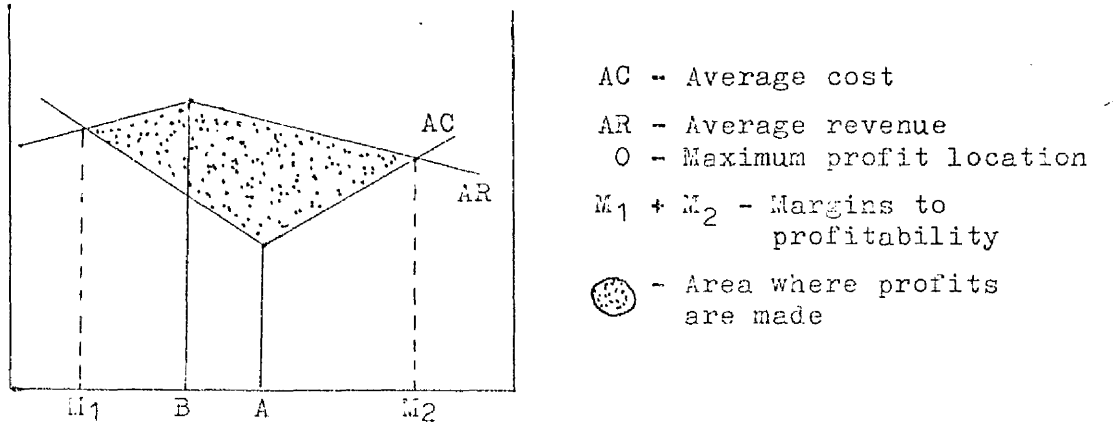


Fig 3.9 Least Cost Location under Spatially Variable Costs and Revenues
Source: Smith (1966)

This type of analysis shows that as the spatial variation in costs or demand increases, so the slopes of the curves steepen, and the area within which it is profitable to manufacture is reduced. Therefore if costs or demand vary markedly within Scotland incoming industry is likely to be concentrated in relatively few locations, whereas if the spatial variations are small the firms are likely to be more widely dispersed. The fact that immigrant industry was initially concentrated in the West of Scotland and Dundee, but then selected a wider range of locations in the 1960s, suggests that the spatial cost (or revenue) curves became less steep and the spatial margins to profitability were extended. In this way the profit advantages formerly enjoyed by Clydeside and Dundee were diminished.

3.4.2 The Advantages of a Least Cost Model

Since the model is basically a least cost one attention will be focussed on changes in spatial costs, since Smith (1966) argues that for practical application in empirical research this approach has certain advantages. The most important, according to Smith, is the ability to assess the effect on the location decision of spatially variable supplies of materials and labour. He argues that under the conditions operating in an advanced industrial economy with a high degree of geographical specialisation the least cost approach to the search for a profitable location seems to be more realistic than one based on market area analysis and the locational interdependence of firms. In such economies few industries consist of plants surrounded by their own local market area. The major industries tend to be concentrated in particular locations serving national or international markets. Smith (1971) feels that much of the theoretical attention given to demand factors stems from a desire to extend the theory of imperfect competition, rather than any attempt to match theory with empirical findings.

It is, however, possible that there are differences in this respect between the American and British situations, since Chisholm (1966) has pointed out that market access appears to be more important in

American studies. He suggests that this reflects the greater spatial dispersion of alternative markets in America. Chisholm has also argued that a uniform delivered price is more common in Britain than f.o.b. pricing, with the exception of certain basic, but weight losing, products such as coal and iron ore. Evidence for this comes from Luttrell's (1962) finding that materials and components are usually supplied at a uniform delivered price, and also from Toothill (1961), who found that 70% of firms in Scotland obtained more than half their purchases at a uniform delivered price. Since market prices do not vary to a significant extent between the major centres of economic activity, firms are likely to try and raise profit levels by seeking low cost locations. Only in this way will they be able to maximise the difference between costs and revenues.

Location studies of mobile industry in the UK also support Smith's view that cost rather than demand factors have been the more influential. There is little evidence to suggest that the Scottish market has proved a major incentive for firms to establish new production units in Scotland. Not only is the market relatively small (5.2 million people), but it has been less prosperous than the national UK market when measured by GDP per head, which only increased from 89.6% to 91.5% of the UK average between 1961 and 1971. Cameron and Clark (1966) found that companies which moved to sell either to the consumer or producer markets in the UK Assisted Areas between 1958 and 1963 were responsible for only 5% of the jobs created by incoming industry to these areas, although they represented 17% of the establishments. They also found that 14% of employment (35% of establishments) moved as a result of decisions to reduce costs, whereas 81% of employment (41% of plants) was provided by establishments which only selected an Assisted Area as a second best decision after their initial choice to minimise costs by developing in situ or close to their existing plant had been rejected by the government's IDC policy. Consequently these firms sought the Assisted Area location which resulted in the smallest increase in their production and transport costs. These findings suggest that the location of incoming industry in Scotland is likely to be determined by cost rather than revenue factors.

3.5 HYPOTHESIS FORMULATION

This paper has argued that the reason for choosing a Scottish location may be different from the one deciding the firm in favour of a particular community within Scotland. Interview studies may indicate which location factors predominate at any particular spatial scale, although several scales may share a common factor.

Industrial location theory suggests a possible method of handling this problem analytically. Although industrialists are likely to seek a satisfactory rather than the optimum location where profits are maximised, the influence of cost factors is still likely to be of major importance since they determine the spatial margins to profitability within which a satisfactory location can be sought. From this it is possible to hypothesise that the general location, in terms of choosing between alternative regions, is likely to be determined by economic considerations in that a region outwith the spatial profit margins will be excluded. The steeper the locational cost gradient the greater the cost differences between alternative locations and the smaller the area within which profitable production is possible. In response to such a situation, industry will concentrate within a limited number of regions, such as Clydeside and Dundee in the 1945-51 period.

In contrast, when deciding between places in the same region and all offering the prospect of potentially profitable production, theory suggests that since a satisfactory, rather than optimum, location will be chosen there is a higher probability of the decision being affected by non-economic considerations. These are often identified in location surveys as minor factors, but in fact may be the critical ones at the intra-regional level. There is also a dynamic aspect to the situation to be considered because theory also indicates that as spatial cost differences narrow non-economic or psychic cost considerations are increasingly likely to become the marginal determinants of location. Even if costs are everywhere equal an even distribution of incoming

industry is improbable since psychic costs and the satisfaction derived from an area by an industrialist are likely to vary spatially.

It has already been shown that the distribution of incoming industry varied between the four sub-periods into which the post-war era has been divided, with a wider spread of plants throughout Scotland occurring in the 1960s. The variable cost model suggests a number of potential hypotheses to explain these changes, of which the most marked have been the declining attraction of the West Central region and the growing preference for eastern Scotland. According to the model this is a function of the erosion of spatial cost differentials within the country as a whole, and especially within the central belt, causing the area within which profitable production is possible to widen. This has enabled incoming industry to consider alternative locations away from the West Central region.

Any of three possible changes may have occurred. Areas such as Clydeside and Dundee, which initially dominated the distribution pattern, may have had their cost advantages totally overturned, so that firms in these areas now experience a cost penalty relative to other parts of Scotland. Alternatively, the earlier advantage may have been eliminated, without becoming negative, so that spatial production and distribution costs are relatively constant at least within Central Scotland. Consequently location decisions are determined by non-economic considerations. Finally, West Central's cost advantage may still remain but at a sufficiently reduced level to be outweighed by lower psychic costs elsewhere. In the latter two scenarios psychic costs are hypothesised as becoming increasingly important during the course of the post-war era, enabling industrialists to obtain higher levels of satisfaction in other parts of Scotland.

The main components of cost suggested by the variable cost model are transport and production costs and it is necessary to decide which variables best represent these factors and how they can be measured. The theories indicate that as far as transport costs are concerned access to both inputs (raw materials and components) and to markets (producer and consumer) will be relevant

considerations. The cost and efficiency of the factor inputs will determine production costs per unit of output and this suggests that the important variables are likely to be the cost/availability of land; labour; capital (assumed here to be fixed capital investment in the shape of factory buildings, plant and machinery, the cost of which is reduced by the availability of suitable premises and of government incentives); and enterprise, in the form of management skills, which are assumed to be more cheaply available in areas with low psychic costs. The activities of local authorities can be incorporated either within land or capital costs, via their provision of serviced sites and factories, or within the cost of enterprise in that a dynamic local authority can create a favourable image with an industrialist, thereby effectively reducing his psychic costs. In addition, costs can be reduced by taking advantage of agglomeration economies, so that access to large urban areas is likely to be a relevant factor, but since the actual benefits are notoriously difficult to quantify they are discounted in this analysis.

Consequently the location of incoming industry to Scotland is hypothesised as being a function of the three different cost elements of transport costs, production costs and psychic costs. The main constituent parts of these costs will be discussed in the succeeding chapters, where special attention is paid to changes within a spatial context in order to consider the implications for individual areas.

PART II

THE EXPLANATORY VARIABLES

CHAPTER 4

TRANSPORT COSTS AND ACCESSIBILITY FACTORS

4.1 INTRODUCTION

Classical location theory depends largely on transport costs for its underlying rationale to explain why costs or demand vary spatially. Although the principal features of the major theoretical contributions have been discussed in Part I, certain of their concepts relating to transport costs are reiterated here because they are relevant to formulating the hypotheses.

According to Weber (1909) the optimum location is the one where transport costs are minimised, since production costs are assumed to be spatially uniform. Access to both inputs and market is important and the cost of movement is proportional to distance and the weight of the product being moved. Consequently the greater the weight loss in processing the more important is access to material inputs, while if a weight gain occurs a market location will be sought.

The market area approach to location theory advanced by Lösch (1954) also gave prominence to transport costs and assumed spatially constant production costs. However, the optimum location was viewed as the point of maximum demand, and since demand is a function of market price, which varies geographically as a result of transport costs, a firm is assumed to locate close to the market to minimise transport costs. Greenhut (1956), however, has

argued that a market location may reflect a desire to be close to customers for reasons of market information and contacts, rather than the need to reduce the cost of transport.

When greater realism is introduced into the simplifying assumptions by recognising that transport costs are not proportional to distance and that freight rates are not a satisfactory measure of movement costs (Hoover, 1948), there is a greater probability that a firm will locate either at the source of inputs or at the market, rather than at an intermediate point.

4.2 CHANGES IN TRANSPORT COSTS OVER TIME

Despite the significance of transport costs in location theory, such costs have decreased in relative importance over time (Chisholm, 1966; McCrone, 1969). Faster and more efficient transport, especially by road, has reduced transport costs as a proportion of total costs and goods can now be moved further, faster, and in larger quantities, allowing economies of scale to operate. This has led to a sharper decline in costs of moving bulk goods than of finished goods (Haggett, 1965).

Technological developments have consistently reduced the quantity of raw materials required per unit of output and components and semi-manufactured goods are increasingly used as the major inputs, especially with the growth of assembly industries (Estall and Buchanan, 1973; Riley, 1973). Consequently access to a particular input has become less important. In addition the newer and growing industries, which have been particularly mobile, are characterised by products which are less bulky and heavy in relation to their value than is the case with the older industries, with the corollary that they are less influenced by considerations of transport costs.

4.3 SOME IMPLICATIONS OF THESE CHANGES

As a result of these developments a number of studies have concluded that many industries choose a new location with little regard to transport cost considerations. Klaasen (1965) suggests that "many industries have become 'footloose' in a sense that their location in the different areas of a country gives rise to only minor differences in production and distribution costs". In fact Luttrell (1962) has argued that two-thirds of all manufacturing might be called potentially mobile and he concluded that large relatively self-contained units with "full local management and technical services for day to day operation and their own production programme can go any distance within the practical limits of Great Britain". Luttrell felt that a firm's organisational arrangements have a greater impact than transport costs on the cost of production in different locations.

The Toothill Committee (1961) in their study of the Scottish economy took the view that transport costs now constitute a relatively insignificant barrier to economic development since they represent only about 2%-4% of total costs and can be offset by lower rent or labour costs in Scotland. Government subsidies, which are shown in the next chapter to represent about 5% of total costs in the latter 1960s, therefore outweigh the additional cost of transport for many industries. A similar view has been put forward by Needleman and Scott (1964), who argue "Britain is, after all, a small densely populated island with an efficient and ubiquitous transport system. The distance between the most widely separated centres of industry, London and the Central Area of Scotland, is only about 400 miles - an inconsiderable distance compared with those over which freight is transported within say the United States ..... (moreover) higher transport costs in the peripheral region may well be more than offset by the lower costs of other inputs, particularly lower rents, rates and labour costs.

Traditional location theory suggests that mobile industry will locate either at the source of inputs, at the market or a trans-shipment point but empirical studies provide little support for this contention. The ILAG survey (1973), for example, showed that fewer than one firm in four moving to the Assisted Areas considered

any of these factors to be of major importance in their choice of location. Although material inputs constitute the largest element of total costs (Table 4.1), most materials are obtained at a uniform delivered price. This means they have no location cost and therefore exert no influence on the choice of site.

4.4 ASSESSING THE IMPORTANCE OF TRANSPORT COSTS

Although transport costs are less important than formerly this does not mean either than they are insignificant or that industry is necessarily less constrained in its choice of location than previously. After all, as Klaasen (1965) has pointed out, industry is footloose only in respect of certain factors than need to be specified. Industry may be more footloose only in terms of transport costs and not as a general rule, because other factors may then operate to constrain mobility.

There are in fact a number of reasons for rejecting the view that transport costs are no longer a significant location factor even though their relative importance has declined. It may be misleading to consider them purely in terms of their share of total costs since this ignores the distinction between basic and locational costs. The largest elements of labour, capital and input costs are basic in that they occur in any location and therefore exert no influence on the location decision. It can be argued that the marginal transport costs incurred away from the optimum location should really be assessed as a proportion of locational, not total, costs. If this is done their relative importance in a firm's cost structure will increase markedly. In any case, if other costs are equal transport costs will then become the critical marginal factor and will be significant. Even if transport costs are a relatively small proportion of total costs they may still be large in absolute terms and may represent a high percentage of total profits (Edwards and Townsend, 1958).

But Edwards (1970) has argued that even when conventionally measured transport costs are under-estimated and should be more than the 3.5% of total production costs as measured by the value of sales indicated

TABLE 4.1 TOTAL COST SUMMARY (COST CATEGORIES AS PERCENTAGE OF TOTAL COST)

UK Industry	(1) Labour Costs	(2) Capital Costs	(3) Pur-chases	(4) Trans-port costs	(5) Fuel Costs	(6) Other Costs
Food, Drink & Tobacco	14.1	9.1	66.4	4.1	1.6	4.8
Chemicals & Allied	14.1	10.2	64.3	2.6	3.7	5.2
Metal Manufacturing	20.8	7.7	57.8	2.1	9.4	2.2
Engineering & Electrical Goods	35.1	11.5	46.6	1.4	1.7	3.7
Vehicles	27.8	6.8	60.2	0.9	1.7	2.6
Metal Goods (sundry)	22.9	6.8	64.0	1.6	1.9	2.8
Textiles	23.0	8.2	62.6	1.2	2.4	2.6
Leather Goods	20.9	6.5	66.8	1.2	1.5	3.1
Clothing & Footwear	31.4	6.1	57.2	1.0	0.8	3.5
Bricks & Pottery	32.1	13.4	33.1	7.5	9.6	4.3
Timber & Furniture	30.7	4.6	56.3	3.3	1.3	3.9
Paper & Printing	34.4	11.4	43.5	3.1	2.9	4.6
Other Manufacturing	29.1	8.2	53.6	2.1	2.6	4.4
Construction	44.5	5.4	41.4	3.0	1.0	4.6
Distributive Trades	74.6	25.4				
Miscellaneous Services	76.6	23.4				

SOURCE: Moody and Smith (1973)

in the Census of Production. This is because further transport, usually by the distributive trade, is required before the product of an industry is consumed and there is some double counting in the sales figures but not those for transport costs. Edwards claims that transport costs constitute about 7% of value added and if distribution costs are allowed for then it is likely that transport accounts for at least 9% of the total cost of producing and distributing. This figure is about three times as high as the one suggested by the Toothill Committee (1961).

It also seems likely that transport costs as conventionally measured greatly understate the true costs of distance because, as Klaasen (1965) argues, "the concept of distance to be bridged in a physical sense does not in many cases coincide with the concept of distance that is implicitly or explicitly used by the entrepreneur". Klaasen feels that communication costs, which include time, are likely to be more relevant to decision making because "the importance of direct, quick and often personal contact with related activities, business services, retailers, wholesalers and bankers may exert such a decisive influence that costs of physical transportation are, relatively, of negligible importance".

Communication, rather than transport costs, are basic to the concept of agglomeration economies, which were recognised, although understated, by Weber (1909), who thought they were only critical where neither transport cost savings nor labour cost differentials were dominant (Richardson, 1969). It is within this context that studies by Cameron and Clark (1966) and Cameron and Reid (1966) need to be viewed. They showed that distance is a factor which exerts a significant influence on mobile industry's choice of a new location. For an assembly industry, in particular, there are advantages in being in daily contact with suppliers of materials and components, and for a wide range of industry access to market information by personal contacts is also of considerable importance. The lack of such face to face contact can adversely affect sales and therefore revenue. The fact that incoming plants originate outwith Scotland suggests that communications between parent establishments and their Scottish unit are likely to be particularly significant in terms of administrative and managerial

convenience. Management control may be impaired or require a duplication of facilities, both of which impose cost penalties. Such problems may be reduced if the location enjoys urbanisation economies such as STD telephone links, Telex, Confravision, main line rail terminals and airport facilities.

Cameron and Clark (1966) concluded that accessibility was one of the three location factors of particular importance to mobile industry and that companies sought to establish units in the nearest areas with suitable supplies of labour. They found that Merseyside and South Wales were the Assisted Areas most favoured on accessibility grounds and this is reflected in their success in attracting mobile industry which originated in the UK (Howard, 1968). By contrast, Scotland, which was regarded as "remote", has been much less successful in obtaining such employment in comparison with its share of Assisted Area unemployment (Cameron and Clark, 1966). The critical factor, according to Cameron and Reid (1966) is not the absolute, but the comparative cost of transport in competing locations, so that "there is little point in minimising the importance of the incremental costs associated with a Scottish location if other assisted area alternatives exist which make additional costs appear to be comparatively large".

The fact that Scotland's distance from the main industrial centres of Britain is perceived to be its major disadvantage relative to competing areas is shown in the studies by Cameron and Reid (1966) and ILAG (1973). Cameron and Reid stressed that Scotland's geographical position in relation to the main origin areas of mobile industry and to the main markets and suppliers put the country at a relative disadvantage in attracting English based firms and it was the most frequently mentioned defect of a potential location in Scotland. The ILAG survey corroborated this view and found that 38% of firms rejecting Scotland did so for reasons of communication costs, in terms of moving personnel and information, while 33% rejected it because of the difficulty of moving goods, as reflected in transport costs.

The effect of distance considerations on mobile industry led Cameron and Clark (1966) to conclude that "the general geographic pattern is the main centres of industry spreading outwards, with

the distant peripheral areas receiving weaker and weaker waves of job creation". Additional statistical evidence to support the hypothesis that a distance decay function affects mobile industry has been produced by Keeble (1972) and Sant (1975), who both show there is a significant negative correlation between the amount of industry moving into an area and its distance from the place of origin.

4.5 THE IMPLICATION OF ACCESSIBILITY FACTORS FOR LOCATIONS WITHIN SCOTLAND

Since both theoretical and empirical evidence show that distance exerts an important influence on the locations selected by mobile industry, it might be expected that those areas of Scotland furthest from the main transport routes or centres in the communications network would attract the least industry. The central belt of Scotland enjoys an accessibility cost advantage since it contains the bulk of Scottish industry and population, and the West of Scotland is particularly favoured in this respect. It is the main focus of both internal Scottish and external communications, being the destination of the prime road and rail links with England. It possesses both a major national (Glasgow) and an international (Prestwick) airport and provides a wide range of industrial inputs and markets, together with a comprehensive array of commercial and business services.

Consequently the West of Scotland's decreasing attraction for incoming industry during the course of the 1960s seems unlikely to be explicable in terms of unfavourable accessibility costs relative to the rest of the country. Within Scotland the opening of the Forth road bridge in 1964 benefitted Fife in particular, although the advantage was probably less in terms of reducing transport costs for mobile industry, and more a result of its effect upon personal and psychic costs. Fife no longer appeared to be out on a limb and it was brought more effectively within the city region of Edinburgh, enabling the county to benefit from the city's favourable image. However, the bridge is unlikely to have adversely

affected Clydeside's predominance within Scotland's communications network. In fact during the study period this dominance is likely to have grown as a result of improvements to road, rail and air transport.

4.6 THE EFFECT OF TRANSPORT COSTS ON INDIVIDUAL INDUSTRIES

The influence of transport cost considerations is likely to vary from one industry to another, with different implications for their location preference within Scotland. In itself, the process of industrial mobility is likely to be selective because those industries most affected by transport costs are the least likely to move to Scotland, whereas those which come are likely to be the least affected. Nonetheless there are likely to be different preferences shown towards locations according to their accessibility cost advantages and to whether transport costs bear most heavily on the inputs or finished products.

Edwards (1970) has identified those industries which are the most likely to be constrained by transport costs in their choice of location by ranking them according to the importance of such costs in relation to net output (Table 4.2), while Moody and Smith (1973) have calculated transport costs as a percentage of total costs (Table 4.1). These show that building materials, food, drink and tobacco, and timber and furniture are the most affected, while clothing, vehicles, shipbuilding and engineering, and electrical goods are the least constrained by transport costs. Edwards then ranks industries on the basis of cost per ton-mile and shows that those ranked highly are not necessarily those where transport costs represent a high proportion of production costs. This is because their impact may be offset by a high value added.

The Census of Production figures used by Edwards (1970) do not indicate whether inputs or finished goods bear the brunt of transport costs, but it is possible to attempt this distinction by reference to the ILAG survey (1973). In the former category are food and drink, building materials, and chemicals and in the latter building materials, paper and printing, food and drink, and

TABLE 4.2 MANUFACTURING INDUSTRIES RANKED ACCORDING TO THE IMPORTANCE OF TRANSPORT COST IN RELATION TO NET OUTPUT

1. Bricks, pottery, etc.
2. Food, drink, tobacco
3. Timber, furniture, etc.
4. Chemicals and allied
5. Metal manufacture
6. Paper, printing, etc.
7. Metal goods n.e.s.
8. Other manufacturing
9. Leather, leather goods, fur
10. Textiles
11. Engineering and electrical goods
12. Clothing and footwear
13. Vehicles*
14. Shipbuilding*

* Indicates industries abnormal in their transport needs.

SOURCE: Edwards (1970)

timber and furniture. There is a conflict in these findings in that two industries appear in both groups. However, SIC industry groupings conceal major differences within them which might explain these results. For example, food processing is likely to be located close to the food producing areas or at a port, whereas drink is likely to be market orientated given the weight gain in production. Similarly with building materials, bricks are usually produced at the source of clay, whereas glass will probably be made close to the market given its fragile nature and the difficulty of transporting it. In the case of a product such as cement, the actual site will probably be at the mineral source, whereas the general location might be determined by accessibility to market.

The location patterns of these industries can be examined according to whether or not they selected an Assisted Area location. Prior to 1965 the Assisted Areas, with the exception of the Highlands, were mostly confined to areas accessible to the major markets within Scotland, notably Clydeside, Dundee, Fife and West Lothian. Therefore establishments locating for market reasons would be indistinguishable from those more "footloose" (in terms of transport costs) industries locating in similar areas in order to obtain government assistance. Those mobile industries under-represented in the Assisted Areas are likely to have faced serious cost penalties there, despite the provision of government subsidies. The cost penalty presumably relates to the cost of obtaining inputs, given that most other factor inputs were more readily available in the Assisted Areas.

There is support for this hypothesis in the case of the food industry because between 1945 and 1965 only 61% of the immigrant establishments located in the Assisted Areas, compared with 81% of all mobile plants. The difference is significant at the .05 level for a Chi Square test, which suggests that the food industry was constrained in its choice of location in Scotland by its need for access to inputs.

There was insufficient evidence to suggest that the building material industry suffered similar constraints to the same extent, because although it was under-represented in the Assisted Areas, the numbers involved were too small for significant conclusions

to be drawn. Perhaps not surprisingly, the chemical industry displayed a preference for the Assisted Areas similar to that of industry in general. As the inputs were less frequently Scottish based, unlike the food or building material industries, there were different constraints operating. The most important of these were specialised site requirements and port access, both of which could frequently be met in the Assisted Area (ILAG, 1973).

Another industry that displayed an above average reluctance to take advantage of government subsidies was textiles, where only 59% (19) of the plants located in an Assisted Area. This differed significantly (at the .01 level) from the overall industry pattern. The reason seems to lie with industry specific agglomeration (ie localisation) economies. Incoming textile establishments displayed a strong preference for the traditional textile areas, especially the Borders and Central Ayrshire. ILAG (1973) showed that textiles differed from most other industries in their emphasis on labour, the availability of industrial and commercial services and managerial considerations such as "maintaining contacts". The traditional textile areas provided skilled labour, services geared to the industry's needs and contacts with other firms in the industry.

A final example where transport costs appear to be relevant in explaining the locations selected within Scotland is the clothing industry, which was the only sector to be significantly over-represented in the Assisted Areas within Scotland. Between 1945 and 1965 they attracted about 94% of the clothing plants. This number was significantly (.05 level) greater than that expected on the basis of the overall pattern for industry. Reference to Table 4.1 and to ILAG (1973) indicates not only that transport costs are a very small proportion of net output, but that access to both inputs and to markets is less important than for any other industry group. Consequently the lack of accessibility constraints meant that clothing establishments were particularly footloose, in the conventional transport cost sense, and they were therefore able to select locations where they could take advantage of government subsidies.

CHAPTER 5

GOVERNMENT POLICY AND THE LOCATION OF INDUSTRY WITHIN SCOTLAND

5.1 INTRODUCTION

The effectiveness of government regional policy can be assessed in terms of either its impact upon the generation of additional economic activity and employment or its influence upon the destinations chosen by immigrant industry. Although both factors are discussed in the course of this chapter, the prime concern is with the latter consideration in terms of identifying the reasons why firms have chosen Scotland, and in particular why they have been attracted to different parts of Scotland.

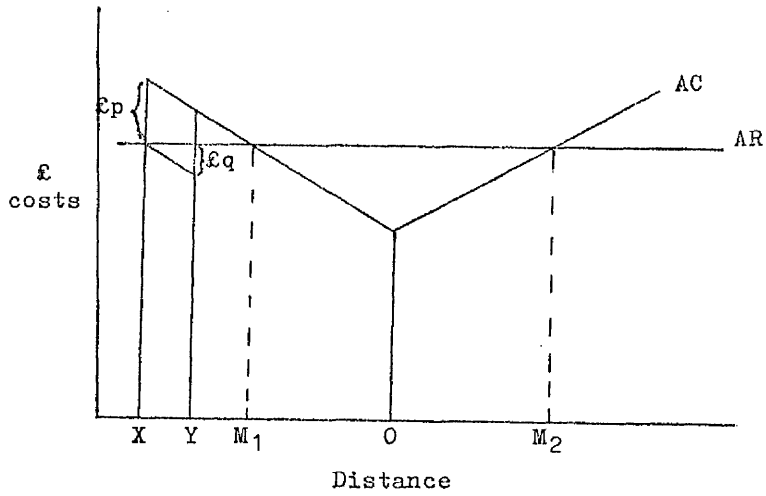
The effect of government financial inducements upon the relative cost advantages of different areas is discussed because, as McCrone (1969) has pointed out, "the purpose of the inducements is to attract development to locations where resources are available and this can best be achieved by influencing the costs of operating in those locations". Such changes in spatial comparative costs are of particular interest in the context of the variable least cost model, which has been used to generate the hypotheses to explain the changing destinations within Scotland selected by incoming industry. The chapter begins by discussing how government financial inducements can be incorporated within the theoretical framework and then considers some of the main policy instruments in order to assess their effect on costs. It then proceeds to consider the implications for different areas and particular industries within Scotland.

5.2 THE THEORETICAL CONTEXT OF GOVERNMENT POLICY

Government policy has incorporated basically two approaches (McCrone, 1969). There has been the negative one of controls on industrial building in the more prosperous areas, primarily by means of Industrial Development Certificates (IDCs) and the positive one of providing financial incentives for firms expanding in the Assisted Areas. Although the latter is of prime interest in the context of this study, both can be incorporated into the modified least cost theoretical framework. This is because building controls can effectively make the cost of a factory infinite if permission is refused, while financial inducements are designed to reduce costs in the Assisted Areas. They have the effect of either increasing the profit obtainable in places within the spatial profit margins or of bringing new areas within the margins by changing a loss making situation into one of profit (Smith, 1966).

This is illustrated by means of space cost curves in Fig 5.1, which is based on Smith's (1966) work. In the area between X and Y a firm would be making a loss, so that to reduce costs below the average revenue (price) line it is necessary to have a subsidy of at leat £p per unit output in the case of the highest cost location at X. In order to bring costs at X down still further and into line with those at Y an additional subsidy of £q is required. Such a situation occurs in practice because the level of government assistance varies according to the designation of the area (Intermediate, Development, Special Development Area).

The success of policy, therefore, will be closely connected with the impact of subsidies upon costs in the Assisted Areas for if financial incentives are pitched at too low a level they will extend the spatial profit margins insufficiently to incorporate the desired areas. In Fig 5.2 a subsidy of £20 per unit output will extend the margin from $M_{(1)}$ to $M_{(3)}$, but the area between X and Y will still be unprofitable and consequently will fail to attract mobile industry even though government assistance is available. A further subsidy of about £60 per unit output would be needed to turn X into a profitable location.



AC = average cost

AR = average revenue

O = least cost location

M_1 = margin to profitability

Fig 5.1 Government subsidy and its effect on spatial profit margins

---

Size of government subsidy per unit output needed to bring locations within spatial margins of profitability

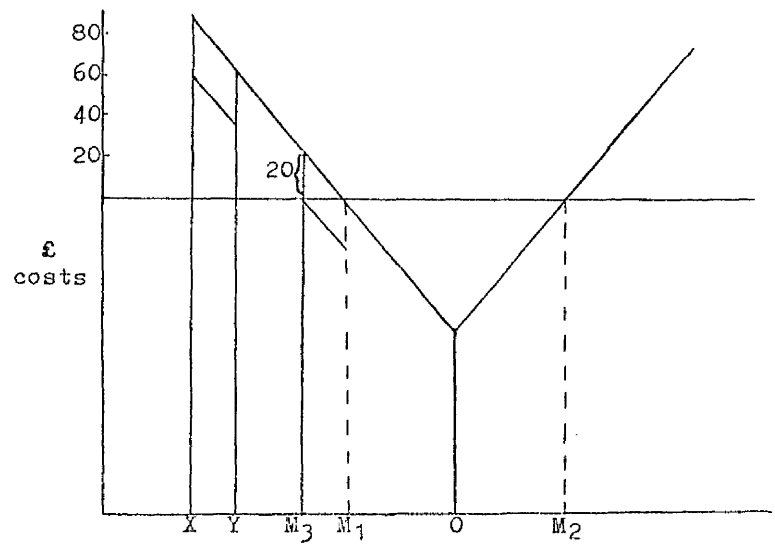


Fig 5.2 The size of subsidy necessary to extend the spatial profit margin to M_3

5.3 THE MAIN POLICY INSTRUMENTS AND THEIR EFFECT ON COSTS

The evolution of regional policy has been discussed in detail by McCrone (1969) and McCallum (1972) and will not be reviewed in detail here, other than to identify the main instruments of policy in order to assess their effects on the relative costs of operating in the Assisted Areas.

In the immediate post-war period of 1946-51, as Cameron and Clark (1966) have pointed out, there was a strong desire to expand output to meet the consumer expenditure boom expected to arise with the lifting of wartime controls and as a result a large volume of industry was potentially mobile. A shortage of factory space owing to war damage and restricted wartime investment on factory modernisation enabled the Government, by use of IDCs, building licences and controls over the allocation of scarce building materials, in addition to the release of former munition factories and the construction of advance factories, to exert a powerful influence on industry's investment decisions. Consequently the cost subsidy represented by the availability of a government factory was extremely large given that the likely alternative was no factory at all.

Wartime controls were lifted in the early 1950s, no further advance factories were built and IDC policy was extremely lax (McCrone, 1969). This weakening of regional policy meant that the cost advantages obtainable in the Development Areas were more limited and restricted largely to the readier availability of serviced sites and government factories either released by a previous tenant or newly built to a firm's requirements (Odber and Bowden, 1958). Moore and Rhodes (1973a) contend that the provision of factory premises represents a large hidden subsidy, which is a part of regional policy. They concluded that the subsidy element is equivalent to 75% of the cost of the building since the discounted present value of rents payable in 21 years was only about 25% of the construction cost.

A more active period of regional policy began in the early 1960s (Moore and Rhodes, 1973a). New financial incentives were introduced by the 1960 Local Employment Act in the form of building grants,

the size of which depended on a somewhat complicated formula and BOTAC advice, although it averaged 17% in the Development Districts (McCrone, 1969). It was also possible to obtain BOTAC special grants and loans if certain cost per job limits were met. Wilson (1964) has calculated that the value of government incentives represented, on average, a differential in favour of the Assisted Areas equivalent to about 10% of capital costs or about 2% of total costs, assuming annual capital costs are equivalent to 20% of total costs.

The incentives were simplified by the 1963 Finance and Local Employment Acts, which introduced a standard 25% building grant, a 10% plant and machinery grant and accelerated depreciation (McCrone, 1969). This has been estimated by Wilson (1964) as being equivalent to a subsidy in favour of the Development Districts equal, on average, to 12% of capital costs or 2.4% of total costs.

Expenditure on regional policy was greatly increased in the 1966 Industrial Development Act, which retained 25% building grants but introduced Investment Grants of 40% for new plant and machinery (45% in 1967-68). This gave a marginal cost advantage to the Assisted Areas worth, on average, about 15% of capital costs (Wilson, 1967). In addition, a subsidy to labour was introduced for the first time in 1967 in the form of the Regional Employment Premium (REP) paid to manufacturers at the rate of £1.50 per week for each male employee, which approximated to 7½% of wage costs (McCrone, 1969). According to Wilson (1967), "at a rough guess, therefore, the combined effect of the capital grants, BOTAC assistance and the employment premium may be put at 5% of the total costs of a profitable firm which has been following an active investment policy". The split between the three types of assistance is about 3%, 0.5% and 1.5% respectively.

If the BOTAC assistance is assumed to be worth a constant proportion (0.5%) over time the value of subsidies as a percentage of total costs in each period can be estimated as 2.5% (1960-62), 2.9% (1963-65) and 5% (1966-70). These estimates are slightly lower than those made by Thomas (1971), who suggests the Development Areas had an annual operating cost advantage of 5.5%

over non-assisted areas between 1966 and 1970, compared with 3.6% in the 1963-65 period. Nonetheless they provide an approximate indication of the potential cost advantages enjoyed by an Assisted Area location compared with one elsewhere in Scotland.

Another innovation in 1967, apart from REP, was the creation of Special Development Areas in a limited number of places severely affected by the closure of coal mines and where alternative job opportunities were very limited. Their appeal for incoming industry was limited, so that to bring them within the spatial profit margins of more firms they were given especially favourable cost subsidies by means of a 35% building grant, assistance to cover operating costs and a five year rent free period for government factories (McCrone, 1969).

5.4 THE IMPACT OF GOVERNMENT ASSISTANCE ON LOCATION DECISIONS

A number of studies have been concerned with the impact of regional policy and have concentrated on three main issues, namely the generation of industrial movement, employment growth in the Assisted Areas, and the attraction of industry. The factors generating movement have been identified using both interview and statistical techniques. The importance of output and employment expansion has been noted by Cameron and Clark (1966), Keeble (1968) and ILAG (1973), while Moore and Rhodes (1976) examined the importance of regional policy relative to other factors in generating movement to the Assisted Areas. They also considered the impact of the individual policy instruments and concluded that on average 80-90% of moves can be attributed to regional policy measures. These conclusions have been challenged by Ashcroft and Taylor (1976), who argue that the effect of regional policy is over-estimated. A slightly different approach has been adopted by Sant (1975), who analysed why individual regions generate different volumes of movement. Sant concluded that the main factors responsible are the size of the origin areas as measured by their manufacturing employment and areal extent, the density and relative importance in spatial terms of their urban areas, and the regions' industrial structure.

Moore and Rhodes (1973a) have sought to estimate the employment generated in the Assisted Areas by regional policy between 1963 and 1970. They identify a net contribution of between 200,000 and 250,000 jobs (30,000-35,000 per annum), after allowing for multiplier effects. Using a different technique Brown (1972) has obtained broadly similar results, arriving at an estimated policy effect of some 35,000 jobs per annum. Such results suggest that government inducements and controls can significantly stimulate employment growth in the Assisted Areas.

Studies of the specific influence of incentives upon the location decisions of mobile industry, as opposed to firms already in the Assisted Areas, support the theoretical argument that by spatial selectivity in subsidising costs the attraction of certain areas to immigrant industry can be enhanced. The ILAG survey (1973), for example, showed that the availability of government inducements is one of the two outstanding factors deciding a firm in favour of moving to Scotland, and Forsyth (1972) has shown that this is also an important consideration with USA firms moving into Scotland. Sant (1975) found strong evidence for the effect of interventionist policies designed to influence the destinations chosen by mobile industry. From this, Sant argued that it can be inferred that when such policies are in operation the location pattern can be predicted with some confidence by observing where they apply.

These findings help to explain why Scotland is chosen instead of a non-assisted area, but not why it was either preferred or rejected when the competing locations are also eligible for government assistance. Some of the possible explanations for this are discussed in the rest of Part II. They provide support for the argument that financial incentives extend the area within which it is profitable for a firm to operate. Therefore incentives are particularly important at the international or inter-regional scale of location decision making when they focus the search for a new site upon the Assisted Areas. However, such inducements are irrelevant when the next spatial scale of decision making comes into operation, since all the Assisted Areas offered equal cost subsidies during the study period, with the exception of the small Special Development Areas from 1967. This is recognised by Cameron and Clark (1966) and, to a lesser extent, by Keeble (1972), since

they are concerned only with this geographical scale of movement, thereby allowing the effect of regional policy to be held spatially constant. Keeble, in fact, explicitly assumes that government inducements are "most unlikely to account for spatial variation in movement within the set of peripheral areas". But such an assumption can be disputed, at least in the Scottish context, because it is argued that when only certain parts of a region are eligible for assistance the availability of financial incentives can then become significant at the intra-regional level. But, as the coverage of the Scottish Assisted Area increases so the effect of regional policy on location decision diminishes, finally vanishing when the whole country enjoys Development Area status.

5.5 GOVERNMENT ASSISTANCE AND THE LOCATION OF INDUSTRY WITHIN SCOTLAND

The effect of regional policy is most pronounced and has been most studied at the inter-regional scale, where it is a major explanation for the movement of industry to the assisted regions. However, its influence on the choice of locations within areas such as Scotland has received less attention, although much of the country was ineligible for government assistance until the mid-1960s. From Table 5.1 it is apparent that until 1963 between 36% and 45% of the country's insured employees were outwith the Assisted Areas and the proportion remained as high as 28% until 1966.

As a consequence of the lower costs made possible by the availability of government incentives, the Assisted Areas within Scotland should be more attractive to incoming firms than elsewhere, although their relative appeal is likely to fluctuate depending on their marginal cost advantage. Since it was lowest in the 1950s the Assisted Areas' attractiveness for incoming industry is liable to have grown during the 1960s, particularly after 1965, as a result of the increased cost subsidy to firms expanding in the Development Areas.

TABLE 5.1 ASSISTED AREAS' ACTUAL AND EXPECTED SHARE OF IMMIGRANT INDUSTRY IN EACH PERIOD

Period	AAs' Share of Insured Employees	AAs' Share of Unemployment	Expected Number (Ins Employees Method)			Expected Number (Unemployment Method)			Actual Number of			Actual Share of		
			Estabs	Employment (000)		Estabs	Employment (000)		Estabs	Employment (000)		Estabs	Employment	
				End of Period	Maximum		End of Period	Maximum		End of Period	Maximum		End of Period	Maximum
1945-51	55.4%	63.5%	80	14.0	34.9	91	16.0	38.1	117	23.3	58.7	81.3%	92.4%	93.1%
1952-59	55.4%	60.5%	42	7.8	16.5	45	9.8	19.0	52	12.0	24.1	69.3%	84.6%	80.6%
(1961)	63.7%	76.5%	86	15.2	25.3	103	18.3	30.4	117	21.7	35.9	86.7%	90.8%	90.2%
1960-65 (1963)	71.8%	81.4%	97	17.1	28.6	110	19.4	32.4						
1966-70	89.8%	95.3%	153	17.1	21.9	163	18.2	23.2	170	19.0	24.4	100.0%	100.0%	100.0%

NOTES: 1. The 1945-51 share is based on 1948 figures.

2. The 1952-59 share is based on 1954 figures.

3. The 1960-65 share is based on both 1961 and 1963 figures owing to the increase in size of Assisted Areas during the period.

4. The 1966-70 share is based on 1966 figures.

Any attempt to test these hypotheses is complicated by changes in the boundaries of the Assisted Areas. If they had remained constant any rise in their share of incoming industry could perhaps be attributed to the increase in financial assistance, assuming that other explanatory variables stayed constant. In fact their boundaries have steadily extended since 1959 away from the immediate post-war core region of Clydeside, with outlying areas around Dundee and Inverness. Between 1945 and 1959 the Assisted Areas contained about 63% of the unemployed and 55% of the insured employees in Scotland (Table 5.1).

In 1960 the definitional basis of the Assisted Areas was changed to coincide with Employment Exchange boundaries since the new Development Districts were designated on the basis of their unemployment (McCrone, 1969). Between 1960 and 1963 the area eligible for financial assistance was extended across the central belt of Scotland into Fife, as well as southwards to Stranraer and northwards to cover the whole of the Highlands and Islands, with outliers in North East Scotland. In 1963 the Development Districts accounted for 81% of Scotland's unemployment and 72% of its insured employees, but these proportions were to rise to 96% and 90% respectively in 1966, when the boundaries were further enlarged and the term "Development Area" was reintroduced. Only the Edinburgh, Leith and Portobello Exchange areas were excluded from assistance.

One method of identifying the effect of government regional policy within Scotland is to compare, by means of a Chi-Square test, the actual volume of incoming industry attracted to both the non-assisted and the Assisted Areas with a notional "expected" figure based on their share of Scotland's insured employees. Table 5.1 compares the actual and expected amount of industry and Table 5.2 shows that the difference between them was significant in every period, although it was least pronounced between 1952 and 1959 when regional policy was at its weakest. This supports the hypothesis that the Assisted Areas enjoyed important cost advantages which significantly improved their ability to attract incoming industry.

TABLE 5.2 THE SIGNIFICANCE OF THE DIFFERENCES BETWEEN THE ACTUAL AND EXPECTED DISTRIBUTION OF INDUSTRY IN THE ASSISTED AND NON-ASSISTED AREAS IN EACH PERIOD

Period	Level of Significance: Expected Figures Derived by Insured Employee Method	Level of Significance: Expected Figures Derived by Unemployment Method
1945-51	.001	.001
1952-59	.02	-
1960-65 (a) 1961 (b) 1963	 .001 .001	 .01 -
1966-70	.001	.01

The 1966-70 period is somewhat peculiar in that all the immigrant industry went to the Development Area. This, even allowing for the fact that by this time most of the country had Assisted Area status, is significantly greater than expected (.001 level).

An alternative explanation for the Assisted Areas' relative success in attracting industry at the expense of other parts of Scotland is that they enjoyed a competitive advantage, not so much from the availability of financial incentives as from the presence of other cheaper or more efficient factor inputs. The quality of the labour resources is particularly important in this respect, as the next chapter shows, and it is possible to examine the contention that their attraction for mobile industry has been a function of labour availability rather than government assistance. If unemployment is assumed to be a satisfactory measure of the labour supply, then the actual volume of industry locating in the assisted and non-assisted parts of Scotland can be compared with the expected quantity, based on their respective shares of unemployment in Scotland (Table 5.1).

This hypothesis is tested and rejected as the major explanation of success in attracting industry because in every period, except for 1952-59, the amount of industry moving into the Assisted Areas was significantly larger than expected, even after standardising for labour availability (Table 5.2). The results, however, indicate that some modification is needed to the initial findings. They suggest, for example, that in the 1950s, once the labour supply advantages of the Assisted Areas are taken into consideration, the cost advantage from government regional policy was insufficient to exert a significant diversionary effect on the flow of incoming industry towards the Assisted Areas. This supports the hypothesis that during this period the influence of government inducements on the choice of location in Scotland was weakest.

Another qualification is that in the 1960s part of the reason for the Assisted Areas' attraction lay in their abundant labour supply, because once this is allowed for the significance level falls, and actually vanishes if the expected share is based on the high unemployment year of 1963.

The immediate post-war period is comparable to the early 1960s in terms of the share of incoming industry locating in the Assisted Areas, but as their boundaries had been increased it can be argued that the diversionary effects were relatively greater in the earlier period. Support for this also comes from the finding that the difference between the observed and expected volume of industry was more highly significant (.001 level) for the 1945-51 period than between 1960 and 1965 (.01 level) after allowing for labour supply factors.

In Table 5.1, the amount of industry is measured in terms of the number of plants and by both the maximum employment provided and employment at the end of the period. If the latter is used, then the Assisted Areas attracted about 7,300 more jobs than expected (1,050 per year) between 1945 and 1951, falling to 2,180 jobs (270 per annum) between 1952 and 1959, rising again to 2,250/3,400 jobs (380/570 a year) between 1960 and 1965. The final period saw only an extra 780 jobs (160 per annum) but, as has been shown, the Assisted Areas attracted all the new industry.

The decreasing number of additional jobs attributable to financial incentives, on the assumptions stated, provides evidence for the earlier argument that as the size of the Assisted Area grows the impact on intra-regional location decisions diminishes. Once most areas are able to offer similar cost subsidies, none enjoys any advantage over the others.

5.5.1 The Impact of Government Assistance on the Attractiveness of Individual Areas

The impact of government inducements on the locations chosen within Scotland can be examined in more detail by comparing the amount of industry attracted by an area both before and after it became eligible for assistance. A marked increase suggests that its attractiveness to immigrant industry was significantly enhanced.

This is well illustrated by Fife in Table 5.3. Prior to 1962, when the whole of south Fife became a Development District, the county

TABLE 5.3 THE EFFECT OF ASSISTED AREA STATUS ON AN AREA'S ATTRACTION TO MOBILE INDUSTRY

	Period	Share of Immigrant Industry		
	1) Pre AA 2) Post AA	Establish-ments	Maximum Employment	1970 Employment
Fife	1) 1945-61 2) 1962-70	3.3% 16.5%***	2.6% 19.3%	3.3% 20.8%
Falkirk/ Grangemouth	1) 1945-62 2) 1963-70	1.1% 9.3%***	0.4% 9.1%	0.5% 10.2%
Borders	1) 1945-65 2) 1966-70	3.1% 8.2%**	1.3% 3.8%	1.4% 2.9%
Special Development Areas	1) 1962-67 2) 1968-70	3.3% 8.2%*	3.0% 4.0%	3.4% 4.6%

NB The increase in the number of establishments was significant at the:

* .05 level (Difference of proportion test)

** .01 level (Chi Square test)

*** .001 level (Chi Square test)

attracted only 3.3% of the immigrant plants moving into Scotland, and only 2.6% of the employment (at maximum). After becoming an Assisted Area it could boast dramatic increases in these figures to 16.5% and 19.3% respectively. The volume of industry moving into Fife increased nearly sixfold after 1961, whereas in Scotland as a whole the number of establishments slightly more than doubled. The differences are highly significant (.001 level) and confirm that Fife's attraction to incoming industry grew significantly after it became a Development District.

Several other areas experienced a similar increase in immigrant industry once they became Assisted Areas, particularly the Falkirk/ Grangemouth area, the Borders, and the Special Development Areas (Table 5.3). The Special Development Areas are especially interesting because between 1962 and 1967 they were all Development Areas, but once the inducements were substantially increased the number of plants moving to them increased significantly (.05 level).

It seems probable, on the basis of this evidence, that the changing distribution pattern of incoming industry within Scotland can be partly explained by the effect of government financial inducements. They allowed the recipient areas to enjoy cost advantages over competing locations. Consequently the extension of the Assisted Area away from Clydeside allowed firms to operate profitably over a larger part of Scotland than formerly. The cost advantages previously enjoyed by Clydeside, Dundee and Inverness were no longer confined to these areas and as a result a wider distribution of incoming industry was to be expected after 1959. This raises the question of whether the relative shift towards the east of Scotland has been excessive, or whether it was to be expected when spatial cost differentials were reduced by government policy.

5.6 THE EFFECT OF GOVERNMENT POLICIES ON INDIVIDUAL INDUSTRIES

Once it has been established that priority from government policy enables an area to attract a disproportionately large share of Scotland's incoming industry, there remains the question as to whether all types of industry are equally influenced in their choice

of location. There are theoretical reasons for expecting differences between industries because government incentives have for the most part taken the form of subsidies to capital (REP being the major exception). It might be expected that those industries in which capital costs represent a larger than average part of total costs would be particularly attracted to the Assisted Areas since their costs would be the most heavily subsidised. Brown (1969) has in fact shown that the more capital intensive an industry is, the larger the proportion of its investment that will be undertaken in a Development Area.

Table 5.4 shows that the industries where capital costs were the highest proportion of total costs (over 10%) were bricks, pottery, etc; engineering and electrical goods; paper and printing; and chemicals and allied industries. However, there is no evidence to show that these industries displayed a greater than average preference for an Assisted Area location in Scotland. This is true of any particular sub-period as well as 1945-65 as a whole (1966-70 is excluded because no firms located outwith the Development Area). About 82% of establishments in these sectors located in an Assisted Area, and this is similar to the figure for all industries. ILAG (1973) has shown, in fact, that there is no obvious relationship between attitudes towards government assistance and the proportion of total costs represented by capital investment. The survey identified the industries giving greatest weight to incentives as vehicles, textiles, clothing and footwear, and electrical engineering. Those least influenced were paper and printing, timber and furniture, bricks and cement etc, and food, drink and tobacco.

This finding is not really surprising when the various components of capital cost are considered. Between 1945 and 1959 government incentives primarily took the form of subsidies to sites and factories, rather than to plant and machinery. This meant that industries such as chemicals, with high capital expenditure on plant and machinery, obtained relatively little advantage from an Assisted Area location. Table 5.4 shows the principal elements of capital expenditure in 1963 by industry and identifies those industries most likely to benefit from regional policy because their expenditure on buildings and land is relatively high. Timber and

TABLE 5.4 COMPONENTS OF CAPITAL EXPENDITURE BY INDUSTRY 1963

SIC Order*	% of Capital Expenditure on			
	New buildings	Land & existing buildings	Plant & machinery	Vehicles
3	20.2	4.0	67.2	8.6
4/5	15.9	1.2	76.4	6.5
6	17.9	1.3	77.9	2.9
7/8/9	19.2	5.8	66.6	8.4
10	30.4	3.8	60.9	4.9
11	27.9	2.1	66.4	3.6
12	19.3	6.7	62.6	11.4
13	10.8	3.5	78.9	6.8
14	17.7	8.8	50.0	23.5
15	18.5	8.2	49.3	24.0
16	19.0	3.6	61.3	15.7
17	26.6	9.8	34.6	29.0
18	19.3	5.5	66.5	8.7
19	16.2	3.6	72.0	8.2

* SIC Groups converted to 1968 classification

SOURCE: 1963 Census of Production

furniture, shipbuilding, vehicles, instrument and electrical engineering, clothing and footwear, leather goods and metal goods all devoted 25% or more of their capital expenditure to buildings and land. Shipbuilding and leather goods were not represented amongst the immigrant industries that came between 1945 and 1965, so the hypothesis can be redefined to exclude them.

There was evidence that between 1945 and 1951, when government policy was most actively dependent on providing (ie subsidising) factories and sites, these industries displayed a greater than average preference for the Assisted Areas. About 91% of plants in these industries located in the Development Areas compared with 81% of all immigrant establishments. The difference, based on the actual number of plants, is significant at the .05 level for a Chi Square test. The 1952-59 period produced no support for the hypothesis, reflecting the relaxation of government regional policy as well as the smaller number of immigrant establishments.

In the 1960s the subsidy to capital not only increased but the emphasis changed to give greater weight to plant and machinery costs, which constitute the largest component of capital expenditure. Therefore industries where capital costs in general are high might be expected to be over-represented in the Assisted Areas of Scotland between 1960 and 1965. There was however no evidence for this. In the 1966-70 period, when the increased government incentives might have been sufficient to do this, the extension of Assisted Area status to most of the country makes it impossible to identify such a trend.

If the 1945-65 period is considered as a whole, it is apparent that industries differed in the extent to which they were influenced by the availability of government subsidies. Clothing establishments were particularly attracted by government inducements and were significantly (.05 level) over-represented in the Assisted Areas, whereas both the textile and food industries were significantly under-represented (at the .01 and .05 levels respectively).

The explanation for these patterns appears to be more in terms of the industries' susceptibility to transport costs and accessibility

factors, as the previous chapter showed, rather than the importance of capital costs within their overall cost structure. Those industries, such as clothing, least constrained by transport costs were best placed to move to the Assisted Areas within Scotland to take advantage of the cost subsidies, whereas the financial assistance was often insufficient to divert the textile and food industries from the locations minimising their transport costs.

In conclusion, therefore, the evidence shows that the attainment of Assisted Area status has significantly improved an area's competitive position and this has enabled it to attract more than its expected share of incoming industry. In particular the designation of Special Development Areas (SDAs) had a marked diversionary effect on the flow of immigrant industry coming into Scotland. Consequently the government has had a significant effect on the choice of location by mobile industry, since it can influence an area's attractiveness, either through financial inducements or physical planning controls over factory building. The impact of this policy can be seen in the Scottish locations selected by incoming industry.

CHAPTER 6

THE AVAILABILITY OF LABOUR AND THE ATTRACTION OF INDUSTRY

6.1 THE THEORETICAL TREATMENT OF LABOUR COSTS

Although Weber (1909) recognised that a cheap source of labour could divert the least cost location away from that determined purely by transport costs, it was seen as a subsidiary factor (Fig 3.2). Classical location theory has persistently under-emphasised the importance of labour supply factors. Access to labour, however, is implicitly incorporated within the concept of agglomeration economies (Hoover, 1948). Localisation economies, which are external to the firm but internal to the industry include labour skilled in the requirements of that industry. The overall supply of labour is part of the more general urbanisation economies, which are external to the industry and benefit all establishments in an area. Firms are likely, therefore, to be attracted either to areas with similar industry or to the largest labour markets.

The influence of labour costs can be readily incorporated within Smith's (1971) variable cost model, by utilising the concept of space cost curves. If labour constitutes a major part of a firm's costs and displays relatively pronounced spatial cost variations it can be hypothesised that it will be an important influence on the location decision. This occurs because the cost penalty of siting a new plant away from a cheap labour location will be high.

Labour as a proportion of total costs is shown in Table 4.1, where it is exceeded only by the value of purchases. It is particularly high in the case of engineering and electrical goods and, to a slightly lesser extent, in the clothing industry. Since these sectors dominated the structure of immigrant industry, the cost of labour is likely to be influential in location decisions. Unfortunately there is a lack of detailed information on geographical variations in labour costs within Scotland, apart from average earnings in the planning regions (Table 6.1). Even if it were available careful interpretation would be required since there is little evidence that wage rates exert a strong influence on mobile industry (Cameron and Clark, 1966). The real cost to a firm will depend on issues such as the skills required, the local competition for labour and its productivity.

It is assumed here that the cost of labour is influenced by the relationship between its supply and demand and is inversely related to any excess in supply. The larger the surplus labour in an area, the lower its effective cost. In practice there is only a weak correlation between a region's earnings and its unemployment, but a stronger relationship between the rates of change in earnings and unemployment (Brown, 1972). Nationally negotiated rates tend to enforce inter-regional similarities (Cameron, 1974) and as a result the availability of labour needs to be seen as incorporating financial advantages additional to those relating to wage rates. It is possible to pinpoint some of these advantages. If labour is obtainable locally fewer people have to be moved with the firm or attracted in from elsewhere. Both these are likely to require financial inducements. An adequate supply may also facilitate the more rapid build up of output and enable a firm to take advantage of a sudden market upturn.

Apart from supply factors, the other major influence on labour costs is likely to be government policy. Assistance with training has taken the form of Government Training Centres and financial incentives to firms. For plants in Development Areas, the rate of assistance towards training costs was doubled in 1967 (McCrone, 1969). The only direct subsidy for employing labour has been the Regional Employment Premium, equivalent to 7½% of labour costs when introduced in 1967 (Wilson, 1967). It was specifically

TABLE 6.1 AVERAGE WEEKLY EARNINGS IN EACH PLANNING REGION IN 1970

Region	Full-time men (21 and over)		Full-time women (18 and over)	
	Manual	Total	Manual	Total
	£	£	£	£
W. Central	26.5	28.7	13.0	14.9
Falkirk/ Stirling	26.1	27.7	13.7	14.7
E. Central	24.6	27.7	12.3	15.3
Tayside	22.7	26.0	12.4	14.4
Borders	20.5	22.5	12.9	13.9
South West	24.6	26.4	N/A	13.6
North East	22.2	24.6	11.9	15.0
Highlands	23.3	26.3	10.8	14.2
Scotland	25.2	27.7	12.7	14.9
Great Britain	26.2	29.4	12.9	15.8

SOURCE: Scottish Abstract of Statistics 1971

designed to cut production costs in the Development Areas and thereby allow prices to be reduced. Depending on demand elasticities, this would give producers in these areas a competitive advantage, raise demand for their products and enable them to increase their labour force (McCrone, 1969).

6.2 MEASURING THE LABOUR SUPPLY

Labour can be obtained locally either from established industry, the unemployed or those available for work but not registered as unemployed, or it can be attracted in from other areas. In a tight labour market wages will probably have to exceed those of local industry or of other areas from which labour is to be attracted. This raises the question as to the most satisfactory means of identifying the potential local labour resources.

Although high unemployment rates are generally taken to be indicative of a slack labour market, there are grounds for thinking that this is an over-simplification of the real situation. Development District status, for example, was conferred upon or removed from Employment Exchanges if the unemployment rate rose above or fell below 4½%. However, in terms of attractiveness to incoming industry preoccupation with percentages may be misleading. This is because "when it comes to the question of readily available labour supply for an intending employer, it is not the percentage of unemployment that matters, but the numbers available within a reasonable travel to work radius of the plant" (Davies, 1967).

A small local labour market with a high rate of unemployment is unlikely to be able to meet the requirements of the larger incoming establishments, even if their manpower needs are exceeded by the number unemployed. A restricted labour pool is less likely to be able to provide a sufficient variety of ages, skills, and experience from amongst its workforce, in contrast to a larger centre with a lower rate of unemployment. This is because, as Davies (1967) argues, by far the most important "training centre" for industry is existing industry itself and the unemployed of a district reflect to a greater or lesser extent the industrial

expertise of their environment. Consequently the number of people unemployed will probably be a better indicator of labour reserves than the rate of unemployment. McKay and others (1971) have pointed out that the supply of labour to individual firms is bound to be more elastic in the conurbations given the ability of employees to change employers by adjusting their travel to work journeys.

Although unemployment levels indicate the potential ease of labour recruitment for a firm, this is not to assume that mobile industry will recruit exclusively, or even predominantly, from the unemployed. In fact evidence suggests that this is unlikely and Steuer (1973) argues that "as a broad generalisation, it is fair to say that incoming firms recruit from the employed, creaming off the better workers, rather than from the unemployed".

One difficulty in identifying the potential labour force, especially in the case of female labour, is that the registered unemployment figures provide only a partial indication of the real situation. Many women do not take the trouble to register as unemployed. It is sometimes argued that activity rates provide an alternative means of assessing the state of the labour market, but the actual meaning of differences in activity rates is far from clear. Davies (1967) has pointed out that a reserve of labour indicated by low activity rates in no sense constitutes an economically effective supply here and now for an employer desperately seeking labour. It is necessary to distinguish the economic from the social component in local differences in the attitudes of women to taking employment.

There is no statistical evidence that female activity rates have been relevant in explaining the locations selected by mobile industry in Scotland. There has not even been a consistent relationship. In some periods there was actually a positive correlation between activity rates and the amount of industry moving into an area. After the initial tests, female activity rates were excluded from further consideration.

6.3 DIFFERENT TYPES OF LABOUR

An overall view of labour availability may prove of limited value in explaining the location of incoming industry if there are major differences in the various labour markets between the supply of particular types of labour. Davies (1967) has pointed out that it is misleading to treat the unemployed as "undifferentiated labour units, each equally capable of performing any job". Such an approach ignores both the quality and the efficiency of the input. After all, a supply of unskilled female labour is of small consequence to a firm seeking highly skilled and specialised male labour. Conversely, total labour availability is of little relevance to a female employing establishment if the unemployment figures are dominated by male labour. This is quite a problem given that female unemployment is under-recorded.

This question of distinguishing between supplies of male and female labour is potentially an important one. Changes in the structure of immigrant industry may alter the demand for particular factor inputs, resulting in new locational factors becoming significant. During the course of the post-war period the demand for male labour by incoming industry has declined as a result of the decreasing importance of the mechanical engineering industry and the growing prominence of the mainly female employing electrical engineering and clothing industries. These latter two sectors provided over half the incoming jobs in the late 1960s compared with only about one-quarter just after the war. Prior to the 1966-70 period immigrant establishments created more male than female jobs, although if the two motor vehicle plants are excluded this applies only to the period up until 1960 (Table 6.2).

Spare supplies of male and female labour are identified, to a greater or lesser extent, by means of the unemployment figures, but skilled labour is not so readily distinguished. Fortunately, this is not a serious problem because empirical studies have shown that "far fewer firms cited the availability of skilled labour as a factor determining their choice of location than cited either male or female labour in general" (ILAG, 1973). It appears that companies do not expect to find all their requirements for skilled labour met without undertaking training. Even where

TABLE 6.2 MALE : FEMALE EMPLOYMENT RATIOS IN IMMIGRANT INDUSTRY

Period	Male : female ratio	
	At maximum employment	End of period employment
1945-51	1.3 : 1	1.1 : 1
1952-59	1.5 : 1	1.4 : 1
1960-65	1.2 : 1	1.5 : 1
1966-70	0.8 : 1	0.8 : 1

labour is attracted from established plants in the same industry, the skills required may differ slightly, making retraining necessary (Cameron and Clark, 1966). The overall availability of labour appears therefore to be more important to immigrant industry than the availability of particular skills.

6.4 LABOUR AVAILABILITY AND THE CHOICE OF LOCATION

The critical importance of the availability of labour in location decision making has been a consistent finding in empirical studies of industrial movement. It helps to explain why a particular Assisted Area is chosen, as well as why a particular site is selected within the preferred region. As a result it is relevant to explanations of location choice at both the inter- and intra-regional scale.

Cameron and Clark (1966) concluded that the supply of trainable labour is of overwhelming importance in choosing a new location and their findings accord closely with those of the ILAG survey (1973). This found that very few firms approached their choice of location without regard to the labour supply aspect. The availability of labour, together with government inducements, was the outstanding consideration for about three-quarters of the firms moving to Scotland. Sant (1975) has produced statistical confirmation that these are the two most significant factors in attracting industry to an assisted region.

Given the importance of an adequate supply of labour and the presence of about 40% of the unemployment in the Assisted Areas, Scotland's attraction relative to other regions seems to have been the ready availability of trainable labour. This should not obscure the fact that, on occasions, the presence of localisation economies has been vital. Univac Limited, for example, specifically cited this as an advantage to be found in Scotland. They claimed to need "people with the right sort of background and education, and clearly the place to get them was from our competitors to build up the operation quickly enough" (TISC, 1973). A similar

reason appears to explain the preference of incoming textile establishments for the traditional areas of production such as the Borders and Ayrshire.

Scotland's potential advantage in terms of labour supply has been, to some extent, offset by the distance from the major English exporting regions (Keeble, 1972). Consequently the volume of industry attracted is less than might be expected solely in terms of the labour available. As Cameron and Clark (1966) have pointed out, the general pattern of industrial movement is to establish units in the nearest area with suitable supplies of labour.

Scotland's comparative advantage seems to have been particularly strong for firms requiring female labour, especially in the 1966-70 period. At this time Scotland attracted a higher proportion of female jobs than any other assisted region (Department of Industry, 1973). The growing prominence of the clothing and electrical engineering industries worked to Scotland's benefit. More than any other sectors they attached most weight to a ready supply of trainable labour, particularly of females (ILAG, 1973). Some electronics firms, such as Univac Limited, specifically sought "semi-semi-skilled" female labour which they found was particularly plentiful in Scotland (TISC, 1973). As a result the attraction grew for places with a supply of female labour.

6.5 THE SPATIAL IMPLICATIONS FOR SITE SELECTION WITHIN SCOTLAND

The changing labour requirements of incoming firms have implications for the relative attractiveness of different areas. Those with plentiful resources of female labour do not necessarily have surplus male labour, although this is generally the case. The correlation between male and female unemployment levels is high throughout the post-war period. Nonetheless it did fall from between +0.89 and +0.93 in the 1945-65 period down to +0.82 after 1965. There was a lower correlation between the unemployment rates. It grew from +0.47 prior to 1952 to +0.64 in the early 1960s, but after this it again fell to +0.56.

TABLE 6.3 CENTRAL SCOTLAND COUNTIES, SCOTTISH CITIES AND THEIR SHARE OF SCOTTISH UNEMPLOYMENT

County	1945 - 51 (1948)			1952 - 59 (1954)			1960 - 65 (1963)			1966 - 70 (1966)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Glasgow	39.6	37.0	39.0	37.7	23.6	32.3	34.3	21.8	30.8	32.7	18.5	29.0
Lanarkshire	13.9	29.2	17.7	11.3	17.9	13.8	12.2	16.7	13.5	10.9	18.4	12.8
Dunbartonshire	2.2	2.6	2.3	2.2	3.9	2.8	4.6	4.8	4.6	4.1	3.9	4.1
Renfrewshire	8.3	7.9	8.2	6.3	9.6	7.6	7.9	10.3	8.6	7.3	7.1	7.2
Ayrshire	4.4	2.7	4.0	3.3	4.6	3.8	6.3	8.4	6.9	6.6	9.4	7.3
Stirling/Clackman.	2.2	2.4	2.3	2.5	6.5	4.0	2.9	5.6	3.7	3.0	6.9	4.0
West Lothian	0.9	1.4	1.0	1.2	2.2	1.6	1.6	2.2	1.8	1.6	2.5	1.8
Mid Lothian	0.6	0.4	0.6	1.1	1.3	1.2	1.3	1.6	1.4	1.2	1.6	1.3
East Lothian	0.2	< 0.1	0.2	0.6	0.3	0.5	0.3	0.3	0.3	0.4	0.4	0.4
Edinburgh	7.5	2.9	6.3	10.8	5.2	8.7	5.7	3.1	5.0	5.6	2.5	4.8
Fife/Kinross	2.6	3.4	2.8	2.1	5.4	3.4	5.3	10.0	6.6	5.2	10.4	6.6
Dundee	5.0	2.6	4.4	5.1	4.6	4.9	3.7	3.5	3.7	3.9	2.3	3.5
Aberdeen	3.5	1.8	3.1	5.0	3.2	4.3	3.5	2.7	3.3	2.7	1.6	2.5

Source: Department of Employment

The conclusion to be drawn from these figures is that in the mid-1960s the distribution patterns of male and female unemployment began to diverge more than in the earlier periods. This occurred at a time when female labour was of increasing importance to mobile industry. As a result, immigrant firms might be expected to move to different locations than formerly. The growing preference for sites in the east of Scotland may reflect a new found cost advantage, arising from such trends.

In terms of the overall supply of labour, the west of Scotland in general and Glasgow in particular were most favourably placed. But the developing need for female workers was to the advantage of Stirlingshire, West Lothian and Fife. Their share of Scotland's female unemployment not only exceeded that of male unemployment, but it also increased during the post-war period (Table 6.3). In contrast, the West Central region's share of female unemployment was lower between 1966 and 1970 than in any of the previous periods. This arose largely from the situation in Glasgow, but it was also true of Renfrewshire. Both Lanarkshire and Ayrshire experienced an improvement in their competitive positions after 1965. Although less attractive than formerly in terms of its labour inputs, the West of Scotland still remained the most favourable part of the country because it consistently contained over half the unemployed reserves of female labour.

An indication of the extent to which changes in the location of immigrant plants can be attributed to labour supply factors is given in Table 6.4. This compares each region's actual share of employment in incoming industry with that expected on the basis of its share of unemployment. Although the West Central region failed to attract the expected volume of industry after 1960, the difference was most pronounced after 1965. This coincided with the enhanced attraction of the East of Scotland, which obtained between two and three times the amount of industry expected on the basis of its labour resources.

The overall regional figures disguise conflicting trends within them. These arise from pronounced differences between the various parts of a region in the quality and availability of their factor inputs. In Table 6.5 those areas are shown with either the largest

TABLE 6.4 ACTUAL AND EXPECTED SHARE OF IMMIGRANT INDUSTRY BY SCOTTISH PLANNING REGION

Region	1945-51		1952-59		1960-65		1966-70	
	Expected Share	Actual Share	Expected Share	Actual Share	Expected Share	Actual Share	Expected Share	Actual Share
W. Central	70.1	71.6	58.3	77.1	63.3	56.1	59.0	37.6
Falkirk/ Stirling	2.2	0.2	3.6	6.6	3.2	2.0	3.7	11.2
E. Central	10.4	2.2	14.6	6.0	14.4	36.9	14.1	35.5
Tayside	6.0	23.1	6.5	4.2	5.7	1.3	6.6	2.8
Borders	0.3	0.4	0.4	1.4	0.5	-	0.7	2.4
South West	1.4	0.1	1.6	0.6	2.3	3.4	3.4	2.6
North East	5.3	2.3	7.9	3.3	5.6	0.1	5.7	2.7
Highlands	4.3	0.1	7.1	0.8	5.0	0.2	6.8	5.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Actual Share = % of immigrant industry employment, at maximum

Expected Share = based on the % of Scottish unemployment in the region

TABLE 6.5 AREAS WITH THE LARGEST SURPLUS OR DEFICIT OF INCOMING EMPLOYMENT RELATIVE TO THEIR LABOUR SUPPLY

Period	Areas of surplus employment	Areas of deficit employment
1945-51	Lanarkshire (+16.1) Dunbartonshire (+ 5.2) Dundee (+18.0)	Glasgow (-25.8) Edinburgh (- 5.4)
1952-59	Lanarkshire (+17.1) Dunbartonshire (+ 9.0)	Glasgow (- 8.7) Edinburgh (- 7.3) Aberdeen city (- 4.3)
1960-65	Lanarkshire (+ 9.9) Dunbartonshire (+ 4.8) Ayrshire (+ 3.5) West Lothian (+15.1) Fife (+12.0)	Glasgow (-28.0) Edinburgh (- 5.0) Dundee (- 3.2) Aberdeen city (- 3.3)
1966-70	Lanarkshire (+ 4.9) Stirling/ Clackmannan (+ 7.4) West Lothian (+13.9) Fife (+12.1) Inverness/ Ross-shire (+ 3.0)	Glasgow (-21.3) Renfrewshire (- 6.4) Edinburgh (- 4.8) Dundee (- 3.2)

NOTES

Surplus Employment - the area's share of actual employment (at maximum) exceeded its expected share, based on unemployment, by more than three percentage points.

Deficit Employment - the area's share of expected employment exceeded its actual share (at maximum) by more than three percentage points.

(+ 5.0) - difference between the actual and expected percentage share of employment (at maximum).

surplus or deficit of incoming employment relative to their labour supply. The cut-off point of a difference of three or more percentage points is arbitrary, but has been chosen to identify both the most and least successful areas.

A number of persistent trends can be identified. Lanarkshire has been the most attractive area, experiencing a relatively large "excess" of employment in each period. Dunbartonshire was only marginally less successful in that only in the 1966-70 period was the surplus less than the three per cent cut-off level. These results show that even after 1960 much of the West of Scotland proved attractive to immigrant firms. In this sense the overall regional picture is misleading. It is, however, clear from the figures that the East of Scotland's growing share of incoming industry from 1960 onwards can be attributed to only two areas: namely Fife and West Lothian. They both experienced the largest relative surplus of any parts of Scotland.

In terms of employment deficit, the most marked feature is the continual presence of some or all of the Scottish cities in this category. Both Glasgow and Edinburgh experienced a shortfall of incoming jobs in every period. In Glasgow's case the gap was the largest of any area, and always at least twenty percentage points, with the exception of 1952-59. Dundee moved from a position of a large relative surplus of jobs just after the war to one of deficit in the 1960s. After 1965 the only other area where the number of jobs failed to reach the volume expected was Renfrewshire.

The spatial pattern within the regions is, in general, one of the central city experiencing a shortfall of incoming jobs, with the surrounding counties obtaining at least their expected share on the criteria adopted here. In the West Central region Glasgow's deficit was too large to be offset in the 1960s and was in fact reinforced by Renfrewshire after 1965, despite the continued success of Lanarkshire and to a lesser extent of Dunbartonshire as well as Ayrshire in the early 1960s. This was similar to the position on Tayside and in the North East, where the cities' inability to attract much incoming industry was not counteracted by any pronounced success on the part of their neighbouring

counties. The reverse situation occurred in the East of Scotland, where the counties of Fife and West Lothian were able to more than compensate for the failure of Edinburgh to attract any mobile industry during the 1960s.

6.6 SURPLUS LABOUR RESERVES - HOW REAL ARE THE BENEFITS?

It is possible to suggest two reasons for expecting the distribution pattern of incoming industry to alter in response to the availability of labour. Firstly, there was the growing size of the Assisted Areas within Scotland. Places previously ineligible for government incentives and at a consequent cost disadvantage, despite surplus labour reserves, became able to compete for immigrant firms on a more equal footing. Secondly, there was the shift in demand from male to female labour arising from the changing structure of incoming industry. This favoured those areas with a large supply of female workers. Both trends benefitted Stirlingshire and the East of Scotland in particular, because they were able to offer many resources comparable to those available in the West of Scotland.

Although a wider distribution of immigrant industry was to be expected, Clydeside, and especially Glasgow, should have continued to enjoy the largest comparative advantage. And yet despite this other areas with smaller labour reserves proved more attractive, particularly from the mid-1960s. This suggests that Clydeside's theoretical attraction was either perceived to be illusory, or that it was outweighed by other adverse factors. There is evidence that both may be true.

When labour costs per unit output (efficiency wages) and net output per head (productivity) are considered, there is evidence not only of spatial differences within Scotland, but also that incoming industry was influenced by them. Doubts exist over the quality of Clydeside's labour resources, especially in terms of its productivity and industrial relations. Burroughs Machines Limited have stated that they could have looked for a little bit more in the way of quality of labour than they had on certain

occasions in their two West of Scotland factories (TISC, 1973). Also, the West Central Scotland Plan (1974) concluded that the region displayed a low level of labour productivity, but that average wage levels were similar to those in the UK as a whole. As a result, efficiency wages were relatively high, placing the region at a cost disadvantage. Cameron and Clark (1966) found that mobile industry was aware of, and deterred by, such a situation. They concluded that "labour productivity was assumed to be much the same in all the major Assisted Areas; the one exception being the West of Scotland, where several companies felt that restrictive union working practices would lower labour productivity".

In fact concern over industrial relations seems to have been a more frequent reason for rejecting sites than the suspect productivity of local labour (Cameron and Reid, 1966). There is strong evidence to suggest that Clydeside's competitive position was particularly weak in this respect. This is reviewed in more detail in Chapter 8. The effect of all this appears to cause incoming firms to discount, at least in part, the area's labour supply advantages on the grounds of its suspect quality.

There is also reason to believe that access to labour may be less relevant than formerly (Forsyth, 1972). Changing technology and rising productivity have reduced the labour requirement per unit output and the average size of mobile plants has fallen (Moore and Rhodes, 1976). Burroughs Machines Limited have pointed out that their product used to be fairly labour intensive, but it is becoming increasingly capital intensive. In the past low cost labour was a factor of some importance but this is now less true because of the changing nature of their products (TISC, 1973). A decrease in the significance attached to the supply of labour by mobile industry means that greater attention will be paid to other factor inputs, which then become the marginal determinants of location. The possibility that this may have occurred is examined in the other chapters of Part II.

CHAPTER 7

THE AVAILABILITY OF INDUSTRIAL SITES AND PREMISES

7.1 THE THEORETICAL CONTEXT

The availability of industrial sites and premises can readily be incorporated within the variable cost model, as developed by Smith (1971). Land and factory costs will be important in location decisions only if they vary markedly over space and if their share of spatially variable costs is relatively high. Under such circumstances areas with cheap sites and premises will enjoy a pronounced cost advantage which will increase their attraction for incoming industry.

Direct costs can be measured by the purchase price, suitably discounted, or rent, as well as rates. Although spatial variations exist there is no readily available data to map the distribution, but since there is no strong empirical evidence to suggest that such costs are a major factor in the location decision, this is not a serious difficulty. Cameron and Clark (1966), for example, found that factory rents were ranked very low as an influence on the choice of site. This is consistent with the views of East Kilbride Development Corporation (1965), who have stated that "rents for both sites and factories in East Kilbride are now amongst the highest in Scotland ..... the fact that there is no difficulty in obtaining these rents in competition with heavily subsidised offers elsewhere is a reflection of the fact that industry regards them as a good bargain".

Such conclusions, however, do not necessarily mean that site and factory costs are unimportant to mobile industry. After all, land can be denied to industry by the refusal of planning permission or an Industrial Development Certificate* and this effectively imposes an unbearable cost on industry in the locations concerned. The concept of spatial margins to profitability, within which a firm is free to choose a satisfactory rather than the optimum location, illustrates the potential significance of a suitable available site or building. An industrialist may decide that a location with a site or factory immediately available is suitable, although not as ideal for production as the one where costs are minimised. A firm can derive important cost advantages from such a decision, as is well illustrated by a site on an industrial estate.

The provision of communal facilities in the form of gas, electricity, water and transport facilities, for example, spreads the cost over many establishments, enabling each to be serviced more cheaply than on individual sites. The cost savings from such external economies can then be passed on to industry. Furthermore, the often lengthy and costly process of obtaining planning permission is avoided, enabling production to be started with the minimum of difficulty. An additional advantage is that an industrialist is given flexibility in that he can meet his changing space requirements within the estate. If a move to a new site or factory is required, distance and disruption costs can be minimised so that the existing labour force and linkages can be maintained.

The ready availability of factory space can also confer important benefits on industry. It allows a firm to undertake pilot production during which employees are trained, production teething troubles are ironed out and the market tested before the commitment is made to a large scale investment programme. In this way, risks are reduced and a company can take advantage of a favourable market situation by starting production without undue delay. This

* IDCs have been required only in the non-assisted areas since mid-1972.

is an important consideration in a situation where time is money. It is these indirect cost advantages rather than the direct ones such as low rent and rates which encourage incoming firms to seek readily available sites and factories. They explain why it is rational for an industrialist to select a satisfactory rather than the cheapest site.

7.2 DIFFERENT TYPES OF INDUSTRIAL SITES AND PREMISES

It is possible to distinguish several different types of both sites and factories and these are each discussed in turn, before their importance to immigrant industry is considered.

7.2.1 The Components of Site Availability

There are two major types of industrial site. The first consists of sites which are fully serviced, immediately available and preferably contain room for expansion. They are best illustrated by industrial estates. A useful definition of such an estate, quoted by Klaasen (1965), is that it is "a device which can take many forms, but which basically refers to a tract of land developed in accordance with an overall plan designed to provide accommodation for a sufficiently large number of factories to make it economical to provide common services and special facilities to the industrial occupants". Although fully serviced sites with industrial zoning are by no means restricted to industrial estates, the alternatives are frequently unsuited to the needs of mobile industry. Many of these sites are too small, inaccessible, physically unsuitable or contain decrepit buildings. It is for this reason, as well as that of easier data availability, that industrial estates have been used as surrogates for the supply of industrial land.

The second type of site is one with special physical or locational characteristics. These cater for those industries with specialised site needs in terms of size, access to facilities such as rail head

or water frontage, or the presence of effluent disposal facilities to cope with heavy pollution. Sites with such demanding requirements are less generally available and are sought by a restricted range of industries, as both Cameron and Clark (1966) and ILAG (1973) point out. They appeal most to the food and drink, chemical, metal production, bricks and cement, and paper industries. In addition, very large plants place great weight on site availability, especially where new units are being established by assembly producers, particularly in the motor vehicle industry where land is also required for stocking vehicles.

The cost of industrial land can be indicated in a very general way by the availability of sites on industrial estates, if it is assumed that such sites confer certain cost advantages for the reasons already discussed. This gives those areas with industrial estates a comparative advantage in attracting mobile industry.

Two methods have been used to measure the amount of such land available to industry; namely, the total acreage of all industrial estates of more than five acres and the acreage of those estates at maximum effectiveness (Table 7.1). This latter concept has been introduced because as an estate is developed the amount of land available for new industry decreases, along with its appeal to incoming firms. This of course explicitly assumes that the age of an estate and its attraction to industry are inversely related.

The time taken to fill an industrial estate varies depending on its size, location, the letting policy of the developers and the success of local and central government industrial development policies. A large estate close to a city may fill up more quickly than a smaller one in a rural area, so that size alone is not an adequate criterion. Time has been used as the critical factor determining an estate's pulling power, with a period of ten years being assumed to represent the era of maximum effect. This follows a similar assumption made by Sant (1971) in the case of the impact of new towns. It is of course possible to extend the period of maximum effectiveness by increasing the size of the estate at a later date. This happened, for example, at Hillington, Wardpark (Cumbernauld) and College Milton (East Kilbride). In such instances only the new extension is considered to operate at maximum effectiveness and not the whole estate.

TABLE 7.1 INDUSTRIAL ESTATE ACREAGE DEVELOPED IN EACH PERIOD

Time Period	Total Industrial Estate Acreage												Industrial Estate Acreage at Maximum Effect											
	SIEC			New Town			Local Authority			Total			SIEC			New Town			Local Authority			Total		
	No	Acres	%	No	Acres	%	No	Acres	%	No	Acres	%	No	Acres	%	No	Acres	%	No	Acres	%	No	Acres	%
1945-51	18	1,207	100.%	-	-	-	-	-	-	18	1,207	100.0%	18	1,207	100.0%	-	-	-	-	-	-	18	1,207	[illegible]
1952-59	20	1,223	69.3%	4	391	22.2%	3	150	8.5%	27	1,764	100.0%	20	1,223	69.3%	4	391	22.2%	3	150	8.5%	27	1,764	[illegible]
1960-65	22	1,364	31.9%	10	1,377	32.1%	24	1,541	36.0%	56	4,282	100.0%	7	156	5.1%	10	1,377	44.6%	24	1,541	50.1%	41	3,074	[illegible]
1966-70	41	1,819	26.3%	16	2,205	31.8%	58	2,905	41.9%	115	6,929	100.0%	26	610	11.8%	12	1,814	35.0%	55	2,755	53.2%	93	5,179	[illegible]

7.2.2 Types of Industrial Premises

Industrial premises can be divided into three basic categories; namely purpose built (bespoke) factories constructed to the requirements of the firm concerned, new advance factories and previously occupied premises (including older advance factories). The last two types constitute the stock of readily available premises suitable for immediate occupation by incoming industry. In contrast, bespoke buildings involve a time lag while construction proceeds.

The stock of available premises in an area can be increased by building factories in advance of any known demand in order to supplement the premises released by plant closure or movement. The term advance factory is used here to refer only to single storey buildings, not multi-storey premises such as the Clydeway Centre in Glasgow. This has been done because multi-storey units are higher cost and less flexible, offering no means of lateral expansion. As a result of such drawbacks the Board of Trade told the Springburn Study team (1966) that they would not build flatted factories since "they find such developments unattractive to industrialists". It therefore seems reasonable to exclude such buildings from the category of advance factory space.

Firms requiring a specialised building on account of their large space requirements or the demanding specifications imposed either by the production process or by the nature of the plant and machinery housed within it are likely to favour purpose built premises. On the other hand, establishments with relatively undemanding needs and able to accommodate their production facilities in fairly standard premises are likely to be satisfied with an available building provided that it can be readily and inexpensively adapted to their requirements. This in effect usually means a single storey, relatively modern building in good repair. It is therefore important that factory space should not only be available but also that it should be of a suitable form. This point was stressed by the Springburn Study (1966), which pointed out that "shipyards, foundries, rolling mills, railway locomotive shops etc, are not the sort of premises demanded by the

light or mobile industries which are expanding at present. It follows that attempts to offer Glasgow's old industrial plants as inducements to new industry are foredoomed to failure".

7.3 HISTORICAL PERSPECTIVE AND THE ROLE OF DIFFERENT AGENCIES

Industrial estates were first developed in Scotland in the 1930s as a result of government initiative in attempting to tackle the severe unemployment problems of Clydeside. Four estates were developed, the largest being Hillington on the outskirts of Glasgow. This policy was extended immediately after the war with the development of a further twelve estates in the West of Scotland and two in Dundee, and it was supplemented by the building of advance factories. The Board of Trade through its agent the Industrial Estates Company of Scotland, now called SIEC (Scottish Industrial Estates Corporation*) was responsible for undertaking these developments, which were the main regional policy instruments at this time.

An ambitious programme of 2,750,000 sq ft of advance factory floorspace was planned, of which 98% was scheduled for Clydeside. In reality a slightly reduced building programme actually materialised owing partly to difficulties in obtaining land at Balmore and Shawfield in Glasgow and partly to a cut-back in government expenditure after 1948 as a result of national economic problems.

The 1950s saw development start on the first of the new town industrial estates, in addition to two new SIEC ones. Advance factory building was not resumed until the latter 1950s when East Kilbride and Glenrothes new towns were allowed to build nest units following their earlier complaints that "it was not within Government policy to provide for the building of factories in advance of demand" (Glenrothes Development Corporation, 1955). The

* This is now part of the Scottish Development Agency.

Board of Trade announced the restart of their own programme in 1959 as part of the movement towards a more active regional policy and the building of advance factories was steadily increased throughout the 1960s.

The main feature of the decade after 1960 was the growing number of agencies involved in industrial development. Many local authorities began to take the initiative to attract mobile industry by developing their own industrial estates and constructing advance factories. In the latter 1960s private developers also began to build their own estates and factories, especially in Glasgow where the Ronald Lyon group redeveloped a number of old industrial sites, including redundant shipyards.

The role of each organisation can be complementary as well as competitive, to the extent that they may cater for different demands. SIEC, for instance, give priority to manufacturing industry which provides a net addition to employment, rather than to establishments relocating production without any increase in employment (Springburn Study, 1966). On the other hand, local authorities, new towns and private developers all cater for industry rehousing locally. The private developers, in particular, have attracted such plants together with distribution and repair or service depots, rather than incoming manufacturing establishments (Henderson, 1972). This, plus the lack of readily accessible data, led to the decision to exclude private industrial estates from the analysis. Since such estates only operated between 1966 and 1970 and then attracted only 3% of the incoming plants in this period, it seems reasonable to omit them.

The contribution of the various agencies to the development of new sites and factories in each period can be seen in Tables 7.1 and 7.2. Prior to 1960, SIEC was the dominant developer and the location of advance factories and industrial estates provides an indication of the priorities accorded to different areas by government regional policy. After 1960 the situation changed as a result of the growing efforts of the new towns and local authorities. SIEC's share of new advance factory floorspace fell to 33%, whereas the new towns built over half the new space and the local authorities constructed about 16%. A similar picture

TABLE 7.2 ADVANCE FACTORY FLOORSPACE BUILT IN EACH PERIOD

Period	Advance Factory Floorspace - Square Feet Built							
	SIEC		New Town		Local Authority		Total	
	000 sq ft	%	000 sq ft	%	000 sq ft	%	000 sq ft	%
1945-51	2,280.8	100.0	-	-	-	-	2,280.8	100.0
1952-59	-	-	36.0	100.0	-	-	36.0	100.0
1960-65	540.8	31.4	1,100.0	63.8	82.9	4.8	1,723.7	100.0
1966-70	1,239.6	33.1	1,703.0	45.5	803.6	21.4	3,746.2	100.0
Total	4,061.2	52.2	2,839.0	36.4	886.5	11.4	7,786.7	100.0

occurs with industrial estates. Just after the war all the industrial estates were provided by SIEC, but by 1970 only 26% of the total acreage and as little as 12% of the area at maximum effectiveness was on SIEC estates. These figures illustrate the dramatic way in which the government's monopoly role as the provider of advance factories and industrial estates has been overtaken.

7.4 A COMPARISON OF THE RELATIVE IMPORTANCE OF AVAILABLE SITES AND FACTORY SPACE

It is difficult to disentangle the separate influences of factory space and site availability on the location decision. Most advance factories are built on industrial estates, which also contain a large stock of buildings that can be reallocated whenever they are vacated. A further complication is that the availability of land around a factory to allow for future expansion may be a powerful attraction in addition to the building itself. In this latter case it can be argued that the availability of premises is the prime reason for a firm's interest in a particular industrial estate and the presence of land for expansion only becomes relevant once a short list of possible factories has been drawn up.

Cameron and Clark (1966) have provided evidence to support the argument that factories are the decisive location factor more frequently than sites. They showed that about 38% of firms were strongly influenced in their choice by the immediate availability of ready built premises and found that a factory was ranked more highly by mobile industry than an available fully serviced site. This led them to conclude that, unlike premises, serviced sites were "factors of less importance". Their findings were corroborated by the ILAG survey (1973), which found that premises followed government inducements and labour availability as the most frequently mentioned major determinant of a firm's location and concluded that where this factor operates it tends to be decisive more often than other factors do.

East Kilbride Development Corporation (1965) are in no doubt that factories are a more valuable asset than sites when trying to attract new industry. In their experience "it remained much easier to let advance factories than sites for purpose built premises and occupation of the former frequently induced closer consideration of the latter. Until there is a marked slackening in demand for such premises, clearly the policy must remain to build more as quickly as possible". All the new towns have placed great emphasis on their factory building policies and feel that these have made a vital contribution to their ability to attract mobile industry. Their views have been summarised by Livingston Development Corporation (1971), who have stated that "the immediate or early availability of factories built in advance of known requirements has been of vital importance to industrial development".

A number of major companies are also on record as attaching a great deal of importance to the ready availability of advance factories. Honeywell (1973) have argued that "through the years the existence of factory space that could be moved into within a matter of two or three months has been of tremendous value in persuading our American company to keep putting their assets and their production requirements into this country". Another American electronics firm, Univac (1973), have stated that the critical factor in their decision to develop at Livingston was neither government inducements nor the availability of labour, but the presence of an advance factory. Incentives and labour attracted them to Scotland, but the actual location within the country was dependent on the immediate availability of a suitable factory.

The evidence from this study supports these views. It is assumed that where an immigrant firm constructs a purpose built factory the availability of a site is paramount, but where a firm moves into a new advance factory or previously occupied premises, the availability of the factory itself is of critical importance.

Between 33% (1952-59) and 59% (1966-70) of all immigrant establishments started production on an industrial estate. The proportion rose steadily in the 1960s from the relatively low level of the 1950s when regional policy was lax. In employment terms

TABLE 7.3 MIGRANT INDUSTRY EMPLOYMENT ON INDUSTRIAL ESTATES

(a) Establishments

Type of Ind Site	1945-51		1952-59		1960-65		1966-70		Total	
	No of Estabs	%	No of Estabs	%	No of Estabs	%	No of Estabs	%	No of Estabs	%
SIEC IE	65	45.1	20	26.7	24	17.8	28	16.5	137	26.1
NT IE	-	-	5	6.7	27	20.0	28	16.5	60	11.3
LA IE	-	-	-	-	20	14.8	39	22.9	59	11.3
P IE	-	-	-	-	-	-	5	2.9	6	1.1
All IE	65	45.1	25	33.4	71	52.6	100	58.8	262	50.0
SIEC IS	2	1.4	6	8.0	9	6.7	6	3.5	23	4.4
Non IE	77	53.5	44	58.6	55	40.7	64	37.7	239	45.6
TOTAL	144	100.0	75	100.0	135	100.0	170	100.0	524	100.0

(b) Employment

Type of Ind Site	1945-51		1952-59		1960-65		1966-70		Total	
	Max No Jobs (000)	% of Jobs	Max No Jobs (000)	% of Jobs	Max No Jobs (000)	% of Jobs	Max No Jobs (000)	% of Jobs	Max No Jobs (000)	% of Jobs
SIEC IE	39.8	63.2	4.7	15.8	3.2	8.1	5.3	21.7	53.1	33.8
NT IE	-	-	5.1	17.0	10.5	26.4	4.5	18.5	20.1	12.8
LA IE	-	-	-	-	3.8	9.7	5.0	20.5	8.8	5.6
P IE	-	-	-	-	-	-	1.7	7.1	1.7	1.1
All IE	39.8	63.2	9.8	32.8	17.5	44.2	16.5	67.8	83.7	53.3
SIEC IS	2.8	4.4	3.3	11.1	5.6	14.2	0.9	3.6	12.6	8.0
Non IE	20.4	32.4	16.8	56.1	16.6	41.6	7.0	28.6	60.7	38.7
TOTAL	63.0	100.0	29.9	100.0	39.7	100.0	24.4	100.0	157.0	100.0

KEY: SIEC IE - SIEC industrial Estate
NT IE - New Town Industrial Estate
LA IE - Local Authority Industrial Estate
P IE - Private Industrial Estate
SIEC IS - SIEC Individual Site
Non IE - Not on an Industrial Estate

as many as 68% of incoming jobs were located on industrial estates in the 1966-70 period and the average for the whole of the 1945-70 period was 53% (Table 7.3).

Amongst those immigrant plants which moved to an industrial estate about three out of four occupied existing premises (new advance or previously occupied). This suggests that the buildings rather than serviced sites are the main attractions of an industrial estate (Table 7.4). When a firm occupies an existing building only for a limited period prior to moving into purpose built premises, it might be argued that this is indicative of the site (for the new factory) being either equal to or more important than the immediate availability of premises. Even if this view is accepted in its entirety it still does not affect the conclusions. Between 1945 and 1970 about one in three of all immigrant establishments started in or moved to purpose built premises, indicating that site considerations may have predominated, whereas two out of three gave greater weight to the availability of factory space.

There are some differences between the various types of industrial estate. Relatively more immigrant firms built their own factories on local authority and new town estates than on SIEC estates (Table 7.4). This probably reflects the more recent development of the first two categories of estates, in that they had fewer previously occupied premises available for letting. About one in three establishments moving to SIEC estates started in such premises, which is a much higher ratio than on local authority or new town estates. On each type of estate the most popular choice was the new advance factory, which was initially occupied by over half the incoming plants moving to the industrial estates.

The demand for particular types of factory varied from one period to another. Purpose built premises were most in demand in the 1950s at a time when there was no government advance factory building, and this resulted in a restricted choice of available premises. However in no period did more than one in three immigrants initially build their own premises (Table 7.5). There was a persistent and definite preference for readily available factory space. The main trend, in this respect, was the growing

TABLE 7.4 IMMIGRANT INDUSTRY 1945-70 - TYPE OF FACTORY AND INDUSTRIAL SITE INITIALLY OCCUPIED

Factory Type	Type of Site															
	SIEC Ind Est		New Town Ind Est		Local Auth Ind Est		Private Ind Est		All Ind Ests		SIEC Indiv Site		Not on an Ind Est		Total	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Purpose Built	26	19.0	19	31.7	16	27.1	3	50.0	64	24.4	7	30.4	58	24.3	129	24.6
Previously Occupied	45	32.8	4	6.6	10	17.0	2	33.3	61	23.3	4	17.4	181	75.7	246	46.9
Advance Factory	66	48.2	37	61.7	33	55.9	1	16.7	137	52.3	12	52.2	-	-	149	28.5
Total	137	100.0	60	100.0	59	100.0	6	100.0	262	100.0	23	100.0	239	100.0	524	100.0

TABLE 7.5 TYPE OF FACTORY INITIALLY OCCUPIED BY IMMIGRANT INDUSTRY

Factory Type	1946-51		1952-59		1960-65		1966-70	
	No	%	No	%	No	%	No	%
Purpose Built	29	20.1	25	33.3	36	26.7	39	23.0
Previously Occupied	81	56.3	44	58.7	56	41.5	65	38.2
Advance Factory	34	23.6	6	8.0	43	31.8	66	38.8
a) SIEC Advance Factory	34	23.6	6	8.0	16	11.8	22	12.9
b) New Town Advance Factory	-	-	-	-	19	14.1	18	10.6
c) Local Authority Advance Factory	-	-	-	-	8	5.9	24	14.1
d) Private Advance Factory	-	-	-	-	-	-	2	1.2
All Factories	144	100.0	75	100.0	135	100.0	170	100.0

proportion of firms moving into new advance factories rather than into previously occupied premises. This is a clear indication of the attraction of such buildings to mobile industry. Areas unable to provide advance factories are likely to be at a severe competitive disadvantage, unless they can offer previously occupied but modern factories as a suitable alternative. Since, by the latter 1960s, only about two out of every ten immigrants preferred to wait for a purpose built factory, with its attendant higher risks and greater cash outflow in the difficult early years, it can be concluded that incoming industry generally preferred an available factory to an available site (Table 7.5).

7.5 THE SPATIAL DISTRIBUTION OF AVAILABLE SITES AND FACTORIES

In the immediate post-war period when industrial buildings and sites were scarce, their provision by government effectively lowered development costs and provided a definite cost advantage to the areas containing such facilities. Government policy has given priority to areas of high unemployment and this explains why in 1970 West Central Scotland had 81% of all the industrial estate acreage and 79% of the advance factory space developed by SIEC.

The construction of non-government estates, which were not developed on any scale until the 1960s, reflects the policies of local authorities and new towns rather than those of central government; but since most authorities enjoyed Assisted Area status when they laid out their own estates the policies seem to have been consistent with one another.

The activities of the various agencies undertaking site and factory development can be seen in their different geographical distributions. Central government commitment remained largely with the West of Scotland, although from the mid-1960s when the Assisted Area was extended industrial estates and advance factories were constructed in a growing range of locations throughout Scotland. West Central's share of new SIEC industrial estate acreage at maximum effectiveness fell from 90% just after

the war to 40% by 1970 and its share of new advance factory floorspace declined from 97% to 53% (Tables 7.6 and 7.7).

The new town advance factory programmes also benefitted the West of Scotland more than the East, but although the total industrial estate acreage developed by the new towns was similar in both regions, the East of Scotland had more of the new acreage (at maximum effect) after 1965. The local authorities were most active in the East Central region as can be seen from the distribution of local authority estates and advance factories in Tables 7.6 and 7.7. Their self-help policies counterbalanced the priority the West of Scotland enjoyed from central government policy.

The spatial impact of the combined efforts of all these agencies is important because it caused a change in the geographical distribution of cost advantages during the post-war period. Until 1960 the West of Scotland enjoyed a very definite comparative advantage, with 81% of the industrial estate acreage and virtually all the immediate post-war advance factories. In the 1960s this position began to alter radically as new sites and factories were developed throughout Scotland and the new towns and local authorities supplemented the industrial development activities of central government. The East of Scotland benefitted most from this trend, and by 1965 it contained 57% of the new industrial estate acreage at maximum effectiveness, compared with 35% in the West Central region. By 1970 the respective shares were 50% and 29%. The growing trend towards more capital intensive production methods lowered site employment densities and increased the demand for industrial land. The Grangemouth/Falkirk Regional Survey and Plan (1968) felt that as a result there was a tendency for good industrial sites to be in short supply in central Scotland. Consequently the East of Scotland was favourably placed to benefit from any general scarcity. As far as new advance factory space is concerned, the shift eastwards in comparative advantage has been less dramatic. Even by 1970 the West Central region had more than half of the new floorspace, compared with less than one-third in the East of Scotland (Table 7.7). Nonetheless East Central's share steadily increased after 1960. As a result of these

TABLE 7.6 INDUSTRIAL ESTATES - DEVELOPERS, REGIONS AND TIME PERIODS

Period	Region	Total Industrial Estate Acreage												Industrial Estate Acreage at Maximum Effect									
		SIEC			New Town			Local Authority			Total			SIEC			New Town			Local Authority			Total		
		No	Acres	%	No	Acres	%	No	Acres	%	No	Acres	%	No	Acres	%	No	Acres	%	No	Acres	%	No	Acres	%
1945-51	WCS	16	1,082	89.6	-	-	-	-	-	-	16	1,082	89.6	16	1,082	89.6	-	-	-	-	-	-	16	1,082	89.6
	F/S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	ECS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	T	2	125	10.4	-	-	-	-	-	-	2	125	10.4	2	125	10.4	-	-	-	-	-	-	2	125	10.4
	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	NE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	HI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Scot	18	1,207	100.0	-	-	-	-	-	-	18	1,207	100.0	18	1,207	100.0	-	-	-	-	-	-	18	1,207	100.0
1952-59	WCS	17	1,088	89.0	3	335	85.7	-	-	-	20	1,423	80.7	17	1,088	89.0	3	335	85.7	-	-	-	20	1,423	80.7
	F/S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	ECS	-	-	-	1	56	14.3	1	120	80.0	2	176	10.0	-	-	-	1	56	14.3	1	120	80.0	2	176	10.0
	T	2	125	10.2	-	-	-	-	-	-	2	125	7.1	2	125	10.2	-	-	-	-	-	-	2	125	7.1
	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	NE	-	-	-	-	-	-	2	30	20.0	2	30	1.7	-	-	-	-	-	-	2	30	20.0	2	30	1.7
	HI	1	10	0.8	-	-	-	-	-	-	1	10	0.5	1	10	0.8	-	-	-	-	-	-	1	10	0.5
	Scot	20	1,223	100.0	4	391	100.0	3	150	100.0	27	1,764	100.0	20	1,223	100.0	4	391	100.0	3	150	100.0	27	1,764	100.0

TABLE 7.6 (continued)

Period	Region	Total Industrial Estate Acreage												Industrial Estate Acreage at Maximum Effect									
		SIEC			New Town			Local Authority			Total			SIEC			New Town			Local Authority			Total		
		No	Acres	%	No	Acres	%	No	Acres	%	No	Acres	%	No	Acres	%	No	Acres	%	No	Acres	%	No	Acres	%
1960-65	WCS	18	1,177	86.3	5	672	48.8	8	301	19.5	31	2,150	50.2	5	94	60.3	5	672	48.8	8	301	19.5	18	1,067	34.7
	F/S	-	-	-	-	-	-	3	48	3.1	3	48	1.1	-	-	-	-	-	-	3	48	3.1	3	48	1.6
	ECS	1	52	3.8	5	705	51.2	9	1,002	65.0	15	1,759	41.1	1	52	33.3	5	705	51.2	9	1,002	65.0	15	1,759	57.2
	T	2	125	9.2	-	-	-	-	-	-	2	125	2.9	-	-	-	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SW	-	-	-	-	-	-	2	160	10.4	2	160	3.8	-	-	-	-	-	-	2	160	10.4	2	160	5.2
	NE	-	-	-	-	-	-	2	30	2.0	2	30	0.7	-	-	-	-	-	-	2	30	2.0	2	30	1.0
	HI	1	10	0.7	-	-	-	-	-	-	1	10	0.2	1	10	6.4	-	-	-	-	-	-	1	10	0.3
	Scot	22	1,364	100.0	10	1,377	100.0	24	1,541	100.0	56	4,282	100.0	7	156	100.0	10	1,377	100.0	24	1,541	100.0	41	3,074	100.0
1966-70	WCS	26	1,477	81.2	9	1,074	48.7	12	388	13.4	47	2,939	42.4	14	390	63.9	6	739	40.7	12	388	14.1	32	1,517	29.3
	F/S	-	-	-	-	-	-	4	73	2.5	4	73	1.0	-	-	-	-	-	-	4	73	2.6	4	73	1.4
	ECS	4	81	4.4	7	1,131	51.3	20	1,544	53.1	31	2,756	40.0	4	81	13.3	6	1,075	59.3	19	1,424	51.7	29	2,580	49.8
	T	3	173	9.5	-	-	-	5	183	6.3	8	356	5.1	1	51	8.4	-	-	-	5	183	6.6	6	234	4.5
	B	-	-	-	-	-	-	6	109	3.7	6	109	1.6	-	-	-	-	-	-	6	109	4.0	6	109	2.1
	SW	2	45	2.5	-	-	-	2	160	5.5	4	205	2.9	2	45	7.4	-	-	-	2	160	5.8	4	205	4.0
	NE	4	29	1.6	-	-	-	6	298	10.3	10	327	4.7	4	29	4.7	-	-	-	4	268	9.7	8	297	5.7
	HI	2	14	0.8	-	-	-	3	150	5.2	5	164	2.3	1	14	2.3	-	-	-	3	150	5.5	4	164	3.2
	Scot	41	1,819	100.0	16	2,205	100.0	58	2,905	100.0	115	6,929	100.0	26	610	100.0	12	1,814	100.0	55	2,755	100.0	93	5,179	100.0

TABLE 7.7 ADVANCE FACTORY BUILDING - DEVELOPERS, REGIONS AND TIME PERIODS

Period	Region	Advance Factory Space - Square Feet Built							
		SIEC		New Town		Local Authority		Total	
		000 sq ft	%	000 sq ft	%	000 sq ft	%	000 sq ft	%
1945-51	WCS	2,214.0	97.1	-	-	-	-	2,214.0	97.1
	F/S	-	-	-	-	-	-	-	-
	ECS	-	-	-	-	-	-	-	-
	T	66.8	2.9	-	-	-	-	66.8	2.9
	B	-	-	-	-	-	-	-	-
	SW	-	-	-	-	-	-	-	-
	NE	-	-	-	-	-	-	-	-
	HI	-	-	-	-	-	-	-	-
	Scot	2,280.8	100.0	-	-	-	-	2,280.8	100.0
1952-59	WCS	-	-	24.0	66.7	-	-	24.0	66.7
	F/S	-	-	-	-	-	-	-	-
	ECS	-	-	12.0	33.3	-	-	12.0	33.3
	T	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-
	SW	-	-	-	-	-	-	-	-
	NE	-	-	-	-	-	-	-	-
	HI	-	-	-	-	-	-	-	-
	Scot	-	-	36.0	100.0	-	-	36.0	100.0
1960-65	WCS	353.8	65.4	840.0	76.4	53.5	64.5	1,247.3	72.4
	F/S	-	-	-	-	10.6	12.8	10.6	0.6
	ECS	141.0	26.1	260.0	24.6	18.8	22.7	419.8	24.3
	T	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-
	SW	27.2	5.0	-	-	-	-	27.2	1.6
	NE	18.8	3.5	-	-	-	-	18.8	1.1
	HI	-	-	-	-	-	-	-	-
	Scot	540.8	100.0	1,100.0	100.0	82.9	100.0	1,723.7	100.0
1966-70	WCS	653.3	52.7	1,129.0	66.3	222.6	27.7	2,004.9	53.5
	F/S	41.7	3.4	-	-	155.0	19.3	196.7	5.3
	ECS	209.7	16.9	574.0	33.7	352.0	43.8	1,135.7	30.3
	T	74.2	6.0	-	-	10.0	1.2	84.2	2.2
	B	10.0	0.8	-	-	14.0	1.8	24.0	0.6
	SW	131.6	10.6	-	-	30.0	3.7	161.6	4.3
	NE	105.6	8.5	-	-	20.0	2.5	125.6	3.4
	HI	13.5	1.1	-	-	-	-	13.5	0.4
	Scot	1,259.6	100.0	1,703.0	100.0	803.6	100.0	3,746.2	100.0

developments incoming industry had a wider choice of potential locations and sites were no longer restricted to the areas of high unemployment on Clydeside and in Dundee.

At the city or county scale the best placed areas in terms of the availability of sites and advance factories were Lanarkshire, Fife, West Lothian and Dunbartonshire. In all these counties the new towns made a major contribution, with a share of advance factory floorspace ranging from 90% in Dunbartonshire to 65% in Lanarkshire, 58% in West Lothian and 54% in Fife. These counties proved the most successful in attracting incoming industry in the 1960s and each obtained more immigrant employment than expected on the basis of their labour supply measured by the level of unemployment.

7.5.1 The Distribution of Areas with Adequate and Inadequate Supplies of Land and Factories

In order to place these events into some sort of perspective it is necessary to try and suggest a notional expected level of industrial estate and advance factory building in an area. Using the same method as previously, based on a region's share of Scottish unemployment, it is possible to show that West Central's level of advance factory space only fell short after 1965, when another 200,000 sq ft would have been required to equate its share of new advance floorspace and unemployment (Table 7.8). This contrasts with the East of Scotland, which obtained nearly double the expected floorspace after 1960, culminating in a notional excess of around 600,000 sq ft in the latter 1960s. Other regions with a notional surplus after 1965 were Falkirk/Stirling and the South West, while Tayside, the North East and the Highlands all experienced a notional deficit.

Following a similar procedure with industrial estates, it is possible to select two scenarios depending on whether total acreage or only the new acreage at maximum effect is used. The former will include previously occupied premises coming vacant for letting, whereas the latter is more strictly a measure of

TABLE 7.8 ACTUAL AND NOTIONAL EXPECTED ADVANCE FACTORY FLOORSPACE BUILT IN EACH PERIOD

Period	Region	Advance Factory Floorspace				
		% Share		Converted to sq ft (000)		Difference in sq ft (000)
		Actual	Expected	Actual	Expected	
1945-51	W Central	97.1	70.1	2,214	1,601	+613
	Falkirk/ Stirling	-	2.2	-	50	- 50
	E Central	-	10.4	-	237	-237
	Tayside	2.9	6.0	67	136	- 69
	Borders	-	0.3	-	6	- 6
	S West	-	1.4	-	32	- 32
	N East	-	5.3	-	121	-121
	Highlands	-	4.3	-	98	- 98
	Scotland	100.0	100.0	2,281	2,281	
1960-65	W Central	72.4	63.3	1,247	1,091	+156
	Falkirk/ Stirling	0.6	3.2	11	55	- 44
	E Central	24.3	14.4	420	248	+172
	Tayside	-	5.7	-	98	- 98
	Borders	-	0.5	-	9	- 9
	S West	1.6	2.3	27	40	- 13
	N East	1.1	5.6	19	97	- 78
	Highlands	-	5.0	-	86	- 86
	Scotland	100.0	100.0	1,724	1,724	
1966-70	W Central	53.5	59.0	2,005	2,210	-205
	Falkirk/ Stirling	5.3	3.7	197	139	+ 58
	E Central	30.3	14.1	1,136	528	+608
	Tayside	2.2	6.6	84	247	-163
	Borders	0.6	0.7	24	26	- 2
	S West	4.3	3.4	161	127	+ 34
	N East	3.4	5.7	126	214	- 88
	Highlands	0.4	6.8	13	255	-242
	Scotland	100.0	100.0	3,746	3,746	

NOTE: a) The 1952-59 period is excluded as virtually no advance factories were built.

b) The expected new floorspace is based on each region's share of unemployment.

site availability. Both indices lead to similar conclusions and differ only in their magnitudes. After 1960 West Central experienced a notional deficit of industrial land, the size of which increased in the latter 1960s, however it is measured. This contrasts with the East of Scotland, where there was a large notional surplus throughout the 1960s reaching nearly 2,000 acres of land by the end of the decade (Table 7.9). This figure is obtained by comparing the expected share (14.1%) of new industrial estate acreage with the actual share (50%). The other surplus regions, which were relatively well provided with industrial sites after 1965, were the Borders (73 acres) and South West (29 acres) and the deficit regions were West Central (-1,539 acres), Falkirk/ Stirling (-119 acres), Tayside (-108 acres) and the Highlands (-188 acres).

The conclusion to be drawn from Tables 7.6 to 7.9 is that there was a relative shift eastwards during the 1960s in comparative advantage, as far as the availability of serviced sites and new advance factory space was concerned. But despite the erosion of West Central Scotland's competitive position it still retained an absolute advantage in terms of advance factory space and was on a par with the East of Scotland as far as total, but not new, industrial estate acreage was concerned (Table 7.6). The actual number and extent of the sites and factory floorspace is important because the larger the choice in an area, the higher the probability that mobile industry can find its requirements catered for. A small place with a favourable ratio of space to unemployment may only have a single factory available, whereas a larger centre with a poorer ratio may have more factories to offer. It therefore stands a greater chance of meeting a firm's needs in terms of size, height or quality of the building.

Although the West Central region failed to develop its notional expected share of new sites and factories, especially after 1965, this seems unlikely to account fully for the size of the eastward shift in the distribution of incoming industry. The region attracted less industry than its share of new advance factory space or total industrial estate acreage would indicate to be appropriate. It contained the largest stock of both existing premises and new advance factories and should have been in the

TABLE 7.9 ACTUAL AND NOTIONAL EXPECTED INDUSTRIAL ESTATE ACREAGE AT MAXIMUM EFFECTIVENESS

Period	Region	Ind Est Acreage at Maximum Effectiveness				
		% share		Converted to acres		Difference in acres
		Actual	Expected	Actual	Expected	
1945-51	W. Central	89.6	70.1	1,082	847	+235
	Falkirk/ Stirling	-	2.2	-	26	- 26
	E. Central	-	10.4	-	125	-125
	Tayside	10.4	6.0	125	72	+ 53
	Borders	-	0.3	-	4	- 4
	South West	-	1.4	-	17	- 17
	North East	-	5.3	-	64	- 64
	Highlands	-	4.3	-	52	- 52
	Scotland	100.0	100.0	1,207	1,207	
1952-59	W. Central	89.0	58.3	1,088	713	+375
	Falkirk/ Stirling	-	3.6	-	44	- 44
	E. Central	-	14.6	-	178	-178
	Tayside	10.2	6.5	125	79	+ 46
	Borders	-	0.4	-	5	- 5
	South West	-	1.6	-	20	- 20
	North East	-	7.9	-	97	- 97
	Highlands	0.8	7.1	10	87	- 77
	Scotland	100.0	100.0	1,223	1,223	
1960-65	W. Central	34.7	63.3	1,067	1,946	-879
	Falkirk/ Stirling	1.6	3.2	48	98	- 50
	E. Central	57.2	14.4	1,759	443	1,316
	Tayside	-	5.7	-	175	-175
	Borders	-	0.5	-	15	- 15
	South West	5.2	2.3	160	71	+ 89
	North East	1.0	5.6	30	172	-142
	Highlands	0.3	5.0	10	154	-144
	Scotland	100.0	100.0	3,074	3,074	
1966-70	W. Central	29.3	59.0	1,517	3,056	-1,539
	Falkirk/ Stirling	1.4	3.7	73	192	-119
	E. Central	49.8	14.1	2,580	730	1,850
	Tayside	4.5	6.6	234	342	-108
	Borders	2.1	0.7	109	36	+ 73
	South West	4.0	3.4	205	176	+ 29
	North East	5.7	5.7	297	295	+ 2
	Highlands	3.2	6.8	164	352	-188
	Scotland	100.0	100.0	5,179	5,179	

strongest position to provide factories to meet the demands of incoming industry, even though, in relative terms, the East of Scotland had a better record of advance factory building. On the other hand, the East of Scotland attracted more employment in the latter 1960s than might reasonably be expected on the basis of its available sites and factories. This situation cannot be explained by an over-concentration of new building in only a few locations in West Central which might be deficient in other respects and therefore unattractive to immigrant firms. The advance factories were, in fact, distributed over more employment exchanges* (19) than in the East of Scotland (10). Consequently, factors additional to those of site and factory availability seem to have been operating to deter industry from moving to the West and encouraging it to move to the East of Scotland.

7.6 THE INDUSTRIAL IMPLICATIONS OF INDUSTRIAL SITE AND FACTORY AVAILABILITY

It is of relevance to policy whether or not certain firms are likely to view the availability of a serviced site or a factory as an inducement. If the majority of incoming industries are attracted by such factors, it should be possible to improve an area's appeal to immigrant firms by a policy of industrial estate and advance factory development.

This question is examined by identifying the industries which are either significantly over or under-represented on particular types of site and in certain sorts of premises. In the case of industrial estates, Table 7.10 shows that the only industry in which incoming establishments were found in significantly larger numbers than expected, on the basis of the distribution for all immigrants, was instrument/electrical engineering. Conversely, those industries least attracted either by sites or factories on

* The Glasgow and Edinburgh employment exchanges were counted as one each.

TABLE 7.10 IMMIGRANT INDUSTRIES AND THEIR PREFERENCE FOR PARTICULAR TYPES OF INDUSTRIAL SITE

(a) Immigrant Industry which displayed a significant preference for sites on industrial estates

Industry	Chi Square Test	Number of Establishments	% of Establishments
	Level of Significance		
Instrument/ Electrical Engineering	.001	66	67.3
All Industry	-	262	50.0

(b) Immigrant Industry which displayed a significant preference for sites off industrial estates

Industry	Chi Square Test	Number of Establishments	% of Establishments
	Level of Significance		
Food, drink & tobacco	.001	29	78.4
Textiles	.001	32	76.2
Bricks, Glass etc	.01	23	76.7
All Industry	-	262	50.0

industrial estates, where they were significantly under-represented, were food, drink and tobacco, textiles, and bricks, glass etc (Table 7.10).

In order to determine whether it seems to have been site or factory considerations that caused firms in these industries either to move to or reject industrial estate locations, it is necessary to identify the type of premises they initially occupied. The instrument/electrical engineering plants seem to have been attracted by the availability of new advance factories. Table 7.11 shows that as many as 43% of immigrants in this industry initially started production in a new advance factory, compared with only 28% of all immigrant establishments. If the same proportion had held true for instrument/electrical engineering units, then only 28 would have moved into advance factories. The difference is highly significant at the .001 level.

Although the availability of new factory space rather than a serviced site was of critical importance to this industry, it also appears to have been influenced by the presence of nearby sites on which purpose built factories could subsequently be built to facilitate expansion. A significantly (.01 level) higher proportion of instrument/electrical engineering than of all immigrant establishments expanded into purpose built premises.

New advance factory space also proved a strong attraction to clothing firms because the number starting in such premises was also significantly greater than expected (Table 7.11). The fact that in the 1960s, when advance factory building was particularly pronounced, the clothing and instrument/electrical industries were the commonest incoming industries meant that those areas constructing advance factories enjoyed a major advantage in their ability to attract immigrant firms.

As far as the food, drink and tobacco and the bricks, glass etc industries are concerned, the ILAG survey (1973) shows that they had special site requirements arising mainly from their effluent requirements. These made them unwelcome tenants on industrial estates, where both industries are significantly under-represented (Table 7.10). In addition, ILAG showed that they are strongly

TABLE 7.11 IMMIGRANT INDUSTRIES AND THEIR PREFERENCE FOR PARTICULAR TYPES OF FACTORY SPACE 1945-70

(a) Immigrant Industry which showed a significant preference for Advance Factory space

Industry	Chi Square Test Level of Significance	Number of Establishments	% of Establishments
Instrument/ Electrical Engineering	.001	42	42.9
Clothing	.02	33	39.8
All Industry	-	149	28.4

(b) Immigrant Industry which showed a significant preference for previously occupied premises

Industry	Chi Square Test Level of Significance	Number of Establishments	% of Establishments
Textiles	.02	27	64.3
All Industry	-	246	46.9

(c) Immigrant Industry which showed a significant preference for purpose built premises

Industry	Chi Square Test Level of Significance	Number of Establishments	% of Establishments
Chemicals	.001	15	53.6
Food, drink, tobacco/ Bricks, glass etc	.05	24	35.8
All Industry	-	129	24.6

influenced by the need for access to raw materials. Since this restricts their location choice they are less likely to find a suitable industrial estate (even assuming they are interested) on which to start production. However, their preference for purpose built premises (Table 7.11) relative to immigrant industry as a whole indicates that a site on which to construct such a building is of particular importance.

It is somewhat surprising, at first glance, that the chemical industry, which also tends to require specialised sites and access to raw materials, (ILAG, 1973) is not also under-represented on industrial estates. In fact half of the immigrant chemical plants were on estates, which is the same proportion as for all incoming establishments. The explanation, in this instance, seems to be that many of the plants were at the "lighter", non-polluting end of the chemical industry spectrum, especially in pharmaceuticals, cosmetics and photographic products, and they frequently located on industrial estates. Examples are Organon Laboratories, Flow Laboratories and Polaroid. This does not rule out the importance of site factors to this industry because it displayed a significant preference for purpose built rather than available premises. Table 7.11 shows that over half of the chemical plants built their own premises compared with only one-quarter of all immigrants.

Another interesting finding is the aversion of textile establishments to a site on an industrial estate, despite both their lack of specialised site requirements and a significant preference for previously occupied premises (Tables 7.10 and 7.11). As many as 64% of immigrant textile concerns started production in such buildings compared with 47% of all immigrants. The stock of factories on industrial estates might have been expected to attract textile firms. The reason they did not do so seems to be the importance attached by the industry to localisation economies. Textile firms showed a strong preference for the traditional textile manufacturing areas where they utilised cheap premises which were frequently former mills.

7.7 THE ORIGIN COMPONENT IN THE DEMAND FOR SITES AND FACTORIES

There is evidence that an origin as well as industry component influences the demand for sites and premises. Immigrant plants coming from North America have displayed a particularly strong desire to locate on industrial estates and in advance factories, as can be seen in Tables 7.12 and 7.13. For example, 61% of North American immigrants, but only 47% of those from elsewhere, started on industrial estates. The respective figures for new advance factories were 40% and 25%. In both cases the North American concerns displayed a significantly different preference pattern from that of immigrant industry as a whole.

It was however shown above that the instrument/electrical engineering industry was particularly influenced by the availability of industrial estate sites and factory space and this industry is over-represented amongst North American immigrants. For example, 34% of them were engaged in instrument/electrical engineering, compared with only 14% of establishments from other origins. Nonetheless, even when standardised for industrial structure it is evident, in Tables 7.12 and 7.13, that the North American demand has been strongly biased towards new premises and industrial estates.

The number of establishments within any industry moving into an advance factory is too small to derive statistically meaningful conclusions. However, in all the industries shown, relatively more North American immigrants than others started in new advance factories. When all new premises, in the form of both advance and purpose built factories, are considered together it becomes apparent, in Table 7.13, that North American establishments in both the mechanical and the instrument/electrical engineering industries showed a stronger preference for a new building than did immigrant industry as a whole.

The engineering industries as a group are also of interest for two other distinctive aspects of their demand for sites and factories. They are the only industry in Table 7.12 which is over-represented on industrial estates and, as Table 7.13 shows, they have displayed a pronounced demand for sites on which to construct their own factories.

TABLE 7.12 NORTH AMERICAN EMIGRANT ESTABLISHMENTS ON INDUSTRIAL ESTATES

Industry	Establishments on Industrial Estates			
	North American		Other Origins	
	No	%	No	%
Mechanical Engineering	15	62.5	17	38.6
Instrument/Electrical Engineering	31	75.6	36	63.2
Mechanical, Instrument/Electrical Engineering	46ø	70.7	52	51.5
Metal Goods n e s	5	45.5	21	56.8
Clothing	8	61.5	40	55.6
All Industry	73*	61.3	190	46.9

ø significantly higher than expected: .02 level for Chi Square Test

* significantly higher than expected: .01 level for Chi Square Test

NOTE: Only those industries with more than 5 North American establishments are shown.

TABLE 7.13 NORTH AMERICAN IMMIGRANT ESTABLISHMENTS IN ADVANCE FACTORIES AND NEW PREMISES, 1945-70

Industry	Establishments in Advance Factories				Establishments in purpose built premises				Establishments in all new premises (advance and purpose built)			
	North American		Other Origins		North American		Other Origins		North American		Other Origins	
	No	%	No	%	No	%	No	%	No	%	No	%
Mech Eng	8	33.3	11	25.0	7	29.2	5	11.4	15*	62.5	16	36.4
Instr/Elec Eng	21	51.2	21	36.8	12	29.3	8	14.0	33**	80.5	29	40.8
Mech Instr/Elec Eng	29	44.6	32	31.7	19**	29.2	13	12.9	48***	73.8	45	44.6
Metal goods nes	4	36.4	12	32.4	4	36.4	4	10.8	8	72.8	16	43.0
Clothing	7	53.8	26	36.1	1	7.7	11	15.7	8	61.5	37	51.8
All Ind	48***	40.0	101	25.0	37**	30.8	92	22.8	85	70.8	193	47.8

KEY: Significantly larger than expected at:

* .05 level for Chi Square Test
** .01 level for Chi Square Test
*** .001 level for Chi Square Test

NOTE: Only those industries with more than 5 North American establishments are shown.

The reason for the greater desire on the part of North American immigrants to occupy new premises is unclear. It could reflect aspirations for the new and modern, as well as a willingness and ability to invest in the best possible facilities, rather than selecting cheaper but possibly less efficient alternative, older premises.

7.8 ESTABLISHMENT SIZE AND DEMAND FOR SITES AND PREMISES

There are reasons for thinking that the size of an establishment may affect its demand for a particular type of site or building. Those requiring extensive sites are rarely able to find sufficient land on an industrial estate and as a result it might be expected that average employment size would be lower on industrial estates. The evidence is conflicting because between 1952 and 1965 this hypothesis held, but it did not apply in either the preceding or the following period (Table 7.14). One reason for this is that some of the larger capital intensive plants required extensive sites, but relatively small labour forces, whereas some large employers, especially in the engineering industry, provided relatively high density employment on industrial estates.

Insofar as the relationship between establishment size and factory type is concerned, Klaasen (1965) has argued that "the benefits afforded by the availability of sites, factories and services on industrial estates are particularly important for small firms or new enterprises, especially those which can be accommodated in standard factory buildings offered for rent". This is supported by Cameron and Clark's (1966) findings that the smaller companies were particularly influenced by factory availability. Table 7.14 shows that this is also true of Scottish immigrant establishments. Those building their own premises employed between 50% and 100% more people in each period than those moving into new advance factories, and these in turn tended to be larger employers than firms starting in older, previously occupied, premises which offered less room for expansion.

TABLE 7.14 THE AVERAGE EMPLOYMENT (AT MAXIMUM) OF IMMIGRANT ESTABLISHMENTS - INDUSTRIAL SITES AND PREMISES

	Number of Employees			
	1945-51	1952-59	1960-65	1966-70
Type of Site				
Industrial Estates	613	392	247	165
Not on Industrial Estates	293	409	347	112
Type of Factory initially occupied				
Purpose built	842	633	483	188
Previously occupied	281	275	160	133
New Advance Factory	465	321	313	127
All Industry	438	398	295	143

The size distribution of completed advance factories can be seen in Tables 7.15 and 7.16. These illustrate why the largest employers require purpose built premises, because the median size of SIEC advance factories was only 20,000 sq ft and this is considerably larger than those built by either the new towns or the local authorities. Nest factory construction (defined here as units of under 10,000 sq ft) has been left largely to the local authorities and new towns. Only 5% of the SIEC factories were smaller than 10,000 sq ft, compared with two-thirds of the local authority and as many as three-quarters of the new town advance factories (Table 7.16). The government (SIEC) factories were orientated more towards the needs of larger firms, although in absolute terms the new towns built more large (over 20,000 sq ft) advance factories than SIEC.

SIEC advance factory occupants are conspicuous for the prominence of immigrant firms and for their reluctance to undertake a subsequent move to purpose built premises. Both features suggest a high degree of satisfaction with such buildings. As much as 68% of the SIEC advance factory floorspace built and occupied between 1960 and 1970 was taken by incoming establishments and of these 95% remained in their initial factory, expanding either by constructing extensions or taking nearby advance units. Immigrants starting in local authority advance factories displayed only slightly less stable characteristics in that 88% remained in their original building. A different picture is found in the new towns, where only 65% retained their original factory and one-third subsequently moved to purpose built premises. Differences in factory size seem to provide the explanation for this pattern in that the new towns built relatively more of the smaller units than either SIEC or local authorities. It appears that many immigrants in the new towns started pilot production in premises too small to satisfy their long term needs. Advance factories seem to have fulfilled a valuable function in facilitating initial small scale production while teething troubles are overcome.

Overall there is a strong preference amongst immigrant companies to remain in the same type of premises in which they started, since 89% did not change, although a few of these moved to a

TABLE 7.15 AVERAGE SIZE OF COMPLETED ADVANCE FACTORIES - 000 SQ FT

Authority	All Factories			10,000 sq ft and over		
	Median Size	Lower Quartile	Upper Quartile	Median Size	Lower Quartile	Upper Quartile
SIEC	20.0	13.0	27.5	20.0	13.2	27.8
New Towns	5.0	2.0	6.3	20.0	12.5	25.0
Local Authority	5.0	3.0	10.0	10.0	10.0	20.0

TABLE 7.16 THE SIZE DISTRIBUTION OF ADVANCE FACTORIES BUILT BY DIFFERENT AUTHORITIES

000 sq ft	Space Completed 1960-70 - Number of Factories											
	All Factories						10,000 sq ft and over					
	SIEC		New Towns		Local Authority		SIEC		New Towns		Local Authority	
	No	%	No	%	No	%	No	%	No	%	No	%
1 - 9.9	4	5.3	261	76.1	76	64.9	-	-	-	-	-	-
10 - 19.9	35	46.7	34	9.9	29	24.9	35	49.3	34	41.4	29	70.7
20 - 29.9	22	29.3	35	10.2	10	8.5	22	31.0	35	42.7	10	24.4
30 - 49.9	6	8.0	8	2.3	2	1.7	6	8.4	8	9.8	2	4.9
50 - 79.9	8	10.7	4	1.2	-	-	8	11.3	4	4.9	-	-
80 - 99.9	-	-	1	0.3	-	-	-	-	1	1.2	-	-
Total	75	100.0	343	100.0	117	100.0	71	100.0	82	100.0	41	100.0

similar type of factory. As might be expected, the smallest movement was out of purpose built premises, and the largest from the new town advance factories.

7.9 CONCLUSION

It appears that the distribution of readily available premises has had an important influence on the location of incoming industry. Since 1960 about three out of every four immigrant establishments have started production in available, rather than purpose built factories. Previously occupied buildings have made a greater contribution than new advance factories, but by the latter 1960s the increased scale of advance factory construction resulted in as many immigrants moving into such premises as into previously occupied ones.

The changing distribution of advance factory building, with a decreasing proportion being built in the West of Scotland, seems to offer only a partial explanation for the region's declining share of incoming industry. After all, even in the 1960s the majority of immigrants did not start in an advance factory. The availability of previously occupied space has also been important and the West Central region should have enjoyed an advantage in this respect. Not only does it contain over half of Scotland's manufacturing industry, but it also benefitted most from government industrial development activity, containing as it did about 80% of all the SIEC industrial estate acreage in 1970.

The region's share of new industrial estates fell dramatically during the post-war period and it became less competitive than the East of Scotland. However, the fact that factories rather than sites seem to have been critical to most incoming firms and that West Central should have enjoyed a comparative advantage in terms of this resource suggests that this cannot provide a complete explanation for the changing distribution of incoming industry. It appears, as a result of the industrial development activities of the various agencies in the 1960s, that an increasing number of locations outwith the West of Scotland had factories and sites

available. This represented a very marked change from the earlier periods. Consequently mobile industry was no longer restricted in its choice of potential locations to the West Central region, although the variety of factories available was still likely to be greatest there. In cost terms the region's previous advantages were reduced, but not eliminated (assuming that factory availability and cost are inversely related). The reduction of geographical cost differentials in this way may have either helped to extend the spatial margins to profitability away from the West of Scotland, or else it decreased cost differences inside the margins, particularly within the central belt. A large enough reduction could allow other factors, such as psychic costs, to offset the competitive advantage enjoyed by those places with the largest choice of sites and factories. In this way industry's attention might be drawn to a wider variety of locations where its requirements could be satisfactorily met, especially if there was an urgency to start production.

CHAPTER 8

PSYCHIC COSTS AND THE INFLUENCE OF AN AREA'S IMAGE

8.1 INCORPORATING PSYCHIC COSTS WITHIN THE VARIABLE LEAST COST MODEL

Behavioural theories were shown to incorporate sub-optimal decision making since they recognise that industrialists are essentially "satisficers" who seek to attain certain aspiration levels rather than "maximisers" seeking the optimum solution to their location problem (Simon, 1959). This concept that personal considerations can outweigh economic ones in location decisions is important because it recognises that an industrialist's perception of an area can influence his choice of site, since the decision is rarely confined to purely commercial considerations. Greenhut (1956) has argued that non-financial factors represent a "psychic income" which contributes to the businessman's goal of maximising total satisfaction, and Smith (1966) has shown how concepts such as the image of an area and the search for a satisfactory rather than optimum site can be incorporated within a variable cost model. In deference to this latter approach the term psychic costs is used here to denote the perceived non-financial costs arising from a reduction in an industrialist's total satisfaction as a result of choosing a particular location. They constitute the cost of enterprise in that management is likely to be attracted more readily and cheaply to areas with low psychic costs because higher financial inducements will probably be required to entice managers to those places perceived as being unattractive.

The theoretical discussion showed that the spatial margins to profitability are likely to be determined by economic factors such as costs or revenues, but anywhere within them a manufacturer will be able to find a satisfactory location. As a result the actual choice may be determined by personal preferences based on an impressionistic view of different areas. Townroe (1971) has found that a detailed economic evaluation of alternative sites is unusual, thereby allowing personal feelings to affect the location decision. The opportunity cost of such a decision is the profit forgone by locating away from the least cost location. Therefore the steeper the spatial cost gradient and the further away the chosen location is from the hypothetical optimum, the higher the opportunity cost and the greater the implied psychic cost advantage of the preferred site.

The smaller the variations in cost over space, the greater the probability that psychic cost advantages will be able to offset the financial cost penalties of a non-optimum site. Consequently any trend towards an equalisation of production and transport costs within Scotland is likely to increase the weight exerted on the location decision by personal considerations or psychic costs. In such circumstances it can be hypothesised that psychic cost advantages will increasingly become the marginal determinant in the choice of location.

The influence of psychic costs is illustrated in Fig 8.1 based on Smith's (1966) work. The least cost maximum profit point is at X, although anywhere within the shaded area will enable profits to be made. The margin is determined by the points of zero profits at M_1 and M_2, beyond which losses are sustained.

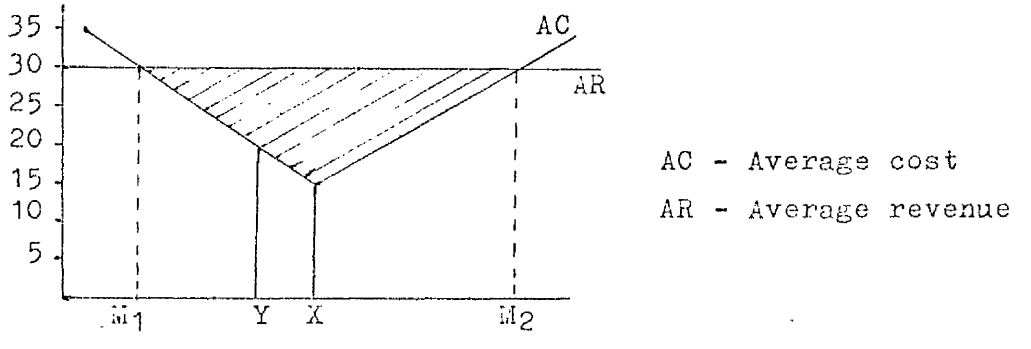


Fig 8.1 The Effect of an Area's Image on the Location Decision

A manufacturer may be deterred from locating at X because of its unfavourable perceived image whereas he is attracted to Y for personal reasons (Fig 8.1). Greenhut tries to rationalise this further via "psychic income" and it can be argued that although Y is a higher cost location than X by £5 per unit output, if the psychic income obtainable at Y exceeds this difference then Y will offer a higher total satisfaction and personal factors will divert the factory from the maximum profit location. An alternative way of expressing this situation is to argue that location X imposes high "psychic costs", and if they are assumed to be more than £5 per unit output this renders X a higher cost location than Y, which becomes the least cost point.

Whether or not the perceived image is realistic is unimportant, and it does not matter if a decision maker is unlikely to use the facilities of an area because as Eversley (1965) points out, it is enough that he should feel that he will be deprived of something by not selecting that particular location. ILAG (1973) found support for this general argument, concluding that amenities and environment appear to play an important supplementary role in decision taking and pointed out that 70% of all firms said they were influenced to some extent by this consideration. Cameron and Clark (1966) also concluded that "an attractive local environment influenced a sizeable minority of companies".

8.2 THE COMPONENTS OF AN AREA'S IMAGE AND THEIR IMPLICATIONS FOR PSYCHIC COSTS

The intangible and subjective nature of the concept makes for difficulty in identifying, let along assessing, the relevant components that go to make up the image. In addition, the type of move being considered may be relevant, for if management and key workers are to move with the plant then the new location must be attractive to them, whereas if few personnel are to transfer the image of the environment for residential purposes is less important. On the other hand, the perception of the work environment as it affects the efficient economic operation of the firm is likely to be relevant regardless of the type of move.

8.2.1 Image of the Physical Environment

It is possible to recognise at least three components that contribute towards the concept of image. Firstly, the physical environment is likely to be the factor influencing a manufacturer's initial impression on visiting an area. A drab town set in scenically unattractive surroundings is unlikely to prove attractive unless the economic arguments in its favour are overwhelming and these may be influenced by the type of industry, because as Klaasen (1965) has pointed out, "the more footloose an industry ..... the more the nature of the general facilities offered by the area will be important". As most of the incoming industry falls into this category, by virtue of the fact that it has moved from elsewhere in the UK or abroad, it means that we should expect immigrant establishments to be under-represented in environmentally depressed areas. The most obvious feature of such places is the low quality of housing and a run-down urban fabric.

If it is assumed that industrialists view Scotland in the context of city regions, it is possible to compare the regional centres using Census data relating to the quality of the urban physical environment (Table 8.1). Glasgow is shown to be the most underprivileged centre and therefore likely to present the most unappealing image, a fact which has been recognised by the sub-committee of the Scottish Housing Advisory Committee (1967), who concluded that "Glasgow has a reputation for bad housing conditions and, despite great efforts by the Corporation this reputation is unfortunately justified". It must be admitted that this is only a partial picture as it cannot illustrate, for example, the value of the numerous attractive Victorian buildings in Glasgow, nor the influence of the Georgian New Town on Edinburgh's image.

8.2.2 Image of the Social/Cultural Environment

A second component is the social/cultural one, which embraces features such as the quality of theatre, musical and other entertainment, the range of eating places, the choice of activities either to watch or participate in, as well as indicators of the

TABLE 8.1 COMPARATIVE STATISTICS OF URBAN CONDITIONS IN SCOTLAND

	Glasgow	Edinburgh	Aberdeen	Dundee	Scotland	Great Britain
Physical Environment						
% of population at over 1.5 persons per room	11.8	4.9	4.0	5.2	5.4	1.6
% of households lacking hot water tap	23.8	10.5	15.1	22.5	12.4	12.5
% lacking bath	32.7	20.2	31.3	32.4	20.0	15.4
% lacking exclusive use of WC	17.8	6.2	30.8	17.9	11.2	8.1
% of owner occupied dwellings	20.1	47.3	29.4	18.4	28.2	46.7
Social Environment						
% of population under 15 years	27.5	23.8	23.4	26.6	26.2	(N/A at
% 15 - 64 years	59.4	62.1	63.0	61.0	61.7	(time of
% over 64 years	13.1	14.1	13.5	12.5	12.1	(
Dependency rates*	683	610	586	641	621	(report
Deaths per 1,000 population (all causes)	13.3	12.9	12.5	12.3	12.3	11.9
Infant mortality per 1,000 live births	27	22	17	20	21	18
% males professionals, managers & employers	8.7	17.3	14.0	11.1	13.2	15.1
% males intermediate & junior non-manual and semi- and unskilled manual workers	48.0	45.0	46.7	46.8	45.7	43.3

* Dependency rates: the number of persons under 15 and those over 64 per 1,000 persons aged 15 - 64

Source: Areas of Need - Glasgow Corporation and Scottish Development Department, 1973

social environment such as the demand for welfare services, social structure, homelessness, crime rates and alcoholism. Without detailed analysis it is impossible to suggest any comprehensive view on the social/cultural image of different areas other than to speculate that the two extremes are likely to be represented by Edinburgh at the favourable end of the spectrum and Glasgow at the other end. The Lothians Regional Survey and Plan (1966) clearly held this view, arguing that the Edinburgh area is one of high amenity value and likely to be favoured by an industrialist wishing a location for his factory which will be attractive both to himself and his workforce. The survey team felt that Livingston New Town could benefit from this association by emphasising its accessibility to the business, social and cultural life of Edinburgh. Edinburgh enjoys international acclaim for its annual Festival, whereas Glasgow's publicity frequently has a negative, not to say sensational, bias, with an emphasis on the "No Mean City" image (McArthur and Kingsley Long, 1956). Examples are articles in "Time" magazine (1973) which concentrated on violence and squalor, and the Sunday Times and Observer Colour Magazines (1968), which both focussed exclusively upon extremes of violent behaviour by teenage gangs. "Time" magazine even went so far as to claim that "for most of this century, Glasgow has been a Mecca for criminologists and sociologists. It is violence, and not the ships built and launched into the slate-grey waters of the Clyde, that gives Glasgow its fame". Glasgow football fans are another popular topic with the media, who frequently appear more interested in off the field activities, especially when Celtic and Rangers play each other.

It is however interesting to note that Cameron and Clark's (1966) study provided support for the contention that "some areas are rejected on social criteria and particularly because of the poor physical and social environment which they are said to possess". A poor perception of Clydeside would appear to be rooted in fact in that Holtermann (1975) concluded that "there is no escaping the conclusion that when deprivation is measured at small area level, Scotland and Clydeside have more of it than anywnere else, it is more severe tnere and there is more of it in the same places. No English conurbation is in the same league as Clydeside".

8.2.3 Image of the Economic Environment

The economic environment representes the third component of "image", and is equally elusive and difficult to measure. It is assumed to exclude wages and labour availability, for which there is quantifiable evidence and which represent a distinct factor and cost of production in their own right. But it includes features such as militancy of the workforce, for which no small area data is provided.

The evidence that is available suggests that not only is this an important consideration to a number of firms but also that once again Clydeside is likely to present a more unfavourable image than other parts of Scotland. Cameron and Clark (1966) found that the desire to locate in an area of good management-labour relations was often mentioned, with strong preferences being expressed for areas which were free from strikes or where union organisation was felt to be relatively weak. They also discovered that a number of companies refused even to contemplate the West of Scotland because of its reputation for militant labour, while some large companies, after considering the region, rejected it on the grounds of the suspect quality and tractibility of labour. Unfortunately for Clydeside, those companies in the important engineering and electrical goods sectors which considered setting up large branch plants showed "a marked desire to establish units in the newer areas, where it was felt the unions would not be so militant as in areas close to the centres of traditional industry" (Cameron and Clark, 1966).

Clear evidence for a difference between the West and East of Scotland has come from Burroughs Machines Limited in their evidence to the Trade and Industry Sub-Committee (1973). They claimed that "in Scotland we have had more than an acceptable amount of labour disruption relative to other places throughout the world - I would say particularly at Strathleven and to some extent at Cumbernauld also". This contrasts with the situation in their Fife plant, where "in the case of the Glenrothes factory, I believe the relationships with the workers and with the unions have been very good". This supports the view expressed by the

Lothians Regional Survey and Plan (1966) that the Edinburgh region does not have a bad reputation for industrial relations.

The West Central Scotland Plan team (1974) found that the region had a poor strike record and concluded that "for all stoppages, the number of days lost per 1,000 employees per annum over the period 1960-68 in West Central Scotland was significantly higher than in the UK as a whole, or in the rest of Scotland". In fact, amongst all regions of Britain only Merseyside had a worse strike record than West Central Scotland between 1968 and 1973 (Table 8.2), after standardising for differences in industrial structure to remove the distorting effect of an over-representation of strike prone industries (Department of Employment, 1976).

The cost of poor industrial relations is likely to arise from disruptions to production which upset the factory's workflow, higher labour costs owing to overmanning and demarcation rules, the diversion of management attention from other problems, penalty clauses for late delivery and the consequent loss of future orders. Any or all of these things will raise the costs of a location in the West of Scotland. Consequently it is possible to incorporate industrial relations within a least cost theoretical framework. The evidence therefore seems to support the hypothesis that the West of Scotland has a distinctly more unfavourable "economic image" than the East, and this is likely to influence the location decisions of mobile industry.

8.2.4 Further Evidence of Spatially Differentiated Images of Scotland and Changes over Time

Further interesting supporting evidence has been provided by the Manpower Research Unit of Heriot-Watt University (1974). They interviewed a sample of managers in England to try and identify their perceived image both of Scotland as a whole and of different areas within the country. Two of their findings are particularly relevant here. In terms of residential preferences, Glasgow had the worst image of any of the Scottish towns considered, whereas Edinburgh was viewed most favourably. In addition, the researchers

TABLE 8.2 INDUSTRIAL STOPPAGES 1968-73

Region/Area	Unadjusted Ratio of Region/GB Annual Average	Adjusted for Industrial Structure: Ratio of Region/GB Annual Average
Scotland		
West Central	1.95	1.74
Falkirk/Stirling	1.01	0.96
East Central	1.27	1.01
Tayside	0.86	0.99
Borders	0.59	0.33
South West	0.34	0.54
North East	0.67	0.70
Highlands	0.19	0.29
Rest of Great Britain*		
South East England	1.61	0.68
East Anglia	1.37	0.70
South West England	0.79	0.82
West Midlands	1.39	1.28
East Midlands	0.92	0.66
Yorkshire & Humberside	1.76	1.01
North West England	5.43	2.43
North England	1.92	0.99
Wales	2.99	1.27

* The figures show the ratios in the worst sub-regions of each standard region.

SOURCE: Department of Employment Gazette, November 1976.

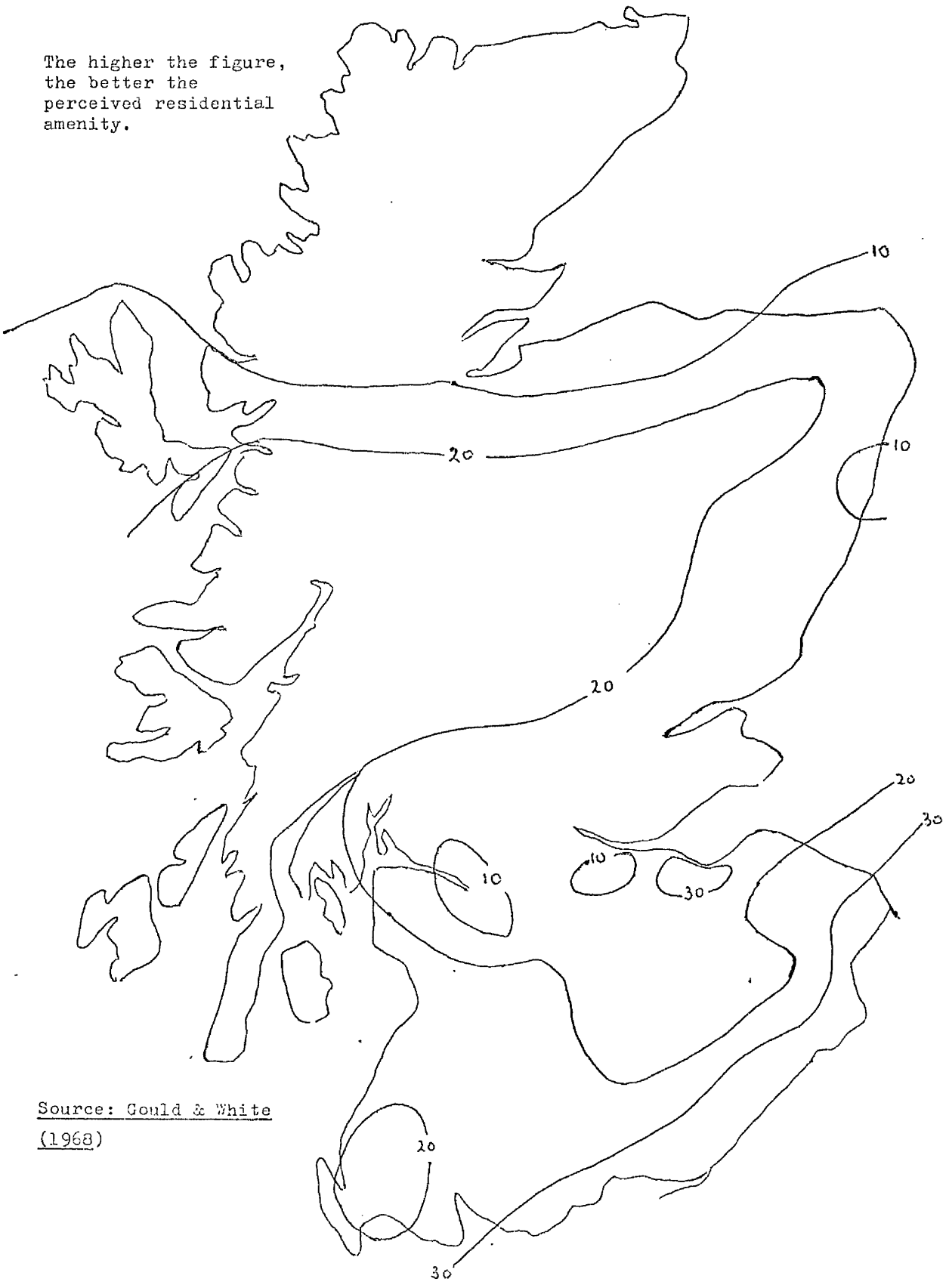
found that it was possible to identify three regional images of Scotland as held by managers in England:- (i) the West Coast (ie basically West Central Scotland) perceived as being wet, but scenically attractive and with a poor workforce unwilling to work; (ii) the East Coast - viewed as being dry and cold. The cities were dull (presumably with the exception of Edinburgh?) but the people were seen to be industrious and the area was considered to offer a good business environment; (iii) the Highlands - viewed as scenically superb but suited principally to primary industry and tourism.

The boundaries between these perceived regions are far from distinct and there will of course be many exceptions within them. It is possible to suggest that the most likely favourable exceptions will be in those places where there is evidence of dynamism, growth and a favourable "business climate" since confidence is important to decision making and there is much truth in the axiom that "nothing succeeds like success". Local authorities are able to play a valuable role in creating and fostering such an image, and the New Towns may be particularly advantaged in this respect.

Gould and White (1968) have produced a perceived residential amenity map of Britain on the basis of the preferences of groups of school leavers throughout the country. The pupils ranked all the counties according to their residential desirability, on the assumption that they could live wherever they wished. After removing the bias towards a preference for local areas a national perception surface is identified and its Scottish component is shown in Map 8.1. Within Scotland the least desirable residential areas are seen to be the Clydeside conurbation, West Lothian, Aberdeen and the northern Highlands, whereas the most attractive places are Edinburgh and the Dumfries and Borders areas.

Although there is strong evidence to suggest that West Central Scotland in general, and Glasgow in particular, have higher psychic costs than elsewhere in Scotland, this does not explain the sudden deterioration in the region's performance in the 1960s. Glasgow's poor reputation is of long standing and unfavourable reports of violence, squalor, poor housing and social problems were not uncommon in the inter-war period. Even the militancy of

MAP 8.1 THE PERCEPTION SURFACE OF RESIDENTIAL AMENITY IN SCOTLAND



Source: Gould & White (1968)

the area's industrial relations is an established phenomenon which was a subject of concern in a study by Glasgow University back in 1932 - "there is the impression that conditions between employers and workers are bad and that the district is one seething with unrest which is of a subversive character". The same report found little interest in the area from foreign businessmen since "in their view, the reputation of the area for strife and disorder was so bad, they would not consider risking their capital in it".

Two possible explanations can be advanced to account for an increased detrimental influence emanating from the area's image in the 1960s. Either Glasgow's reputation suffered a further relative fall or else its effect on location decisions increased as a result of the weakening in importance of other factors. There is evidence that both considerations may have been operating. A series of reports drew attention to the poor state of much of the city's housing stock (Cullingworth, 1968, Scottish Housing Advisory Committee, 1967) and no doubt resulted in the impression that there were few attractive residential areas available in Glasgow. During the same period the city's reputation for teenage violence became a popular topic with the media. Patrick (1973) has pointed out that "news stories on juvenile violence began to appear in the late 50s and early 60s, but it wasn't until 1965 that the trickle of news items on gangs began to swell into a flood ..... by May 1966, the national television and radio networks had taken up the story ..." The city's image as a desirable place in which to live and work must have been tarnished by such publicity.

There are also grounds for thinking that certain locational factors exerted a smaller influence on the decisions of incoming industry in the 1960s. The spreading of Assisted Area status to most of Scotland effectively widened the search areas for mobile industry because West Central Scotland no longer offered a cost advantage on this particular count. Additionally, the slackening of the Scottish labour market as reflected by the worsening unemployment levels during the course of the 1960s enabled industry to obtain its labour needs in a wider choice of locations than previously. Therefore the spatial margins to profitability

were extended with government incentives and labour tending to approximate to basic rather than locational costs as their geographical variations declined. This meant that their effect on locational decisions weakened. Image factors via psychic costs remained strongly differentiated spatially and whereas they were previously of secondary importance to other factors this became less true during the 1960s as spatial cost differences were eroded.

8.3 THE EFFECT OF PSYCHIC COSTS UPON THE LOCATION DECISIONS OF IMMIGRANT INDUSTRY

If the hypothesis is correct that Clydeside in general, and Glasgow in particular, tend to present a poor image which imposes psychic costs and renders these areas less attractive to mobile industry, then this should be reflected in the locations selected by immigrant establishments. The previous discussion suggests that psychic cost considerations are likely to be selective in their effect as regards size of firm, type of industry and the nature of the move. The larger the immigrant establishment the greater the number of managerial staff and key production workers who will be required either to move with the firm or be attracted from elsewhere. In order to obtain such workers the chosen area must present a favourable image in terms of its living and working environment. The critical size threshold where such considerations become important is difficult to identify, but it is possible to suggest a figure of about 300 or more employees. This is the size of establishment identified by Luttrell (1962) as being relatively self contained in its operation and relatively free to operate in all the major industrial centres in the UK.

Those industries most likely to be influenced by "image" factors are the ones where there is a high technological input with a heavy requirement for skilled labour or those which are relatively "footloose" (bearing in mind the previous qualifications concerning this term) and consequently enjoying wide spatial profit margins. Chisholm (1964) has argued that in those industries where rapid technological progress is occurring firms are starting to find it

necessary to consider plant locations which will attract and hold managerial staff and skilled labour. Amongst the industries which best fulfil both these considerations are mechanical, instrument and electrical engineering, which were identified by Cameron and Clark (1966) as being the most reluctant to locate in the West of Scotland. If the argument is correct that considerations of psychic costs became particularly relevant during the 1960s this would suggest that the instrument/electrical engineering industry is the most likely to be responsive to such factors because mechanical engineering became decreasingly important in the structure of immigrant industry during this period.

Finally, the type of move is also a relevant consideration. Transfers, which involved the closure of a plant in one location and its move to a new one, require the movement of the existing labour force or at least the "key" workers if production is not to be disrupted and costs increased by the need to train new labour. Firms moving to areas with an attractive image will be the most likely to retain their existing workforce or to obtain replacement labour. However, the lack of information to distinguish such immigrants which transfer from those set up as new branch plants prevents this hypothesis from being tested.

It is therefore possible to suggest that large plants in the engineering industry in general and instrument/electrical engineering in particular are the ones most likely to be susceptible to locational considerations of a non-pecuniary nature. This is likely to be reflected in their aversion to moving to areas perceived to have an unfavourable image or conversely their preference for those places offering "attractive" environments. It can therefore be hypothesised that such establishments are likely to be under-represented on Clydeside and particularly in Glasgow. For the purpose of this hypothesis Clydeside is taken to be Glasgow, Lanarkshire, Dunbartonshire and Renfrewshire, with the exception of the new towns of East Kilbride and Cumbernauld, which are assumed to present a favourable "image".

Table 8.3 suggests that there is some evidence that large engineering plants were more reluctant to move to Clydeside than other large establishments and that this was a more marked feature of the

TABLE 8.3 THE INFLUENCE OF AN AREA'S IMAGE ON ITS ATTRACTION TO IMMIGRANT INDUSTRY

(1) Clydeside

(a) Share of Large Immigrant Plants - Engineering and All Industries

Period	Engineering Plants		Non-Engineering Plants		All Plants	
	No	%	No	%	No	%
1945-59	23	58.9	23	65.7	46	62.2
1960-70	7	25.0	12	46.2	19	35.2
1945-70	30	44.8	35	57.4	65	50.8

(b) Share of Large Instrument/Electrical Engineering Plants

Period	Instrument/Electrical Engineering Plants		Non-Instrument/Electrical Engineering Plants	
	No	%	No	%
1945-59	16	61.5	30	62.5
1960-70	5	22.7	14	43.7
1945-70	21	43.7	44	55.0

(For notes on plant size and area definitions, see next page.)

TABLE 8.3 (continued)

(2) Glasgow

(a) Share of Large Instrument/Electrical Engineering and Clothing Plants

Period	Instrument/ Electrical Engineering Plants		Non-Instrument/ Electrical Engineering Plants		All Plants		Clothing Plants		Non-Clothing Plants	
	No	%	No	%	No	%	No	%	No	%
1945-59	3	11.5	12	25.0	15	20.3	3	33.3	12	25.0
1960-70	-	-	3	9.4	3	5.6	1	6.3	2	4.3
1945-70	*3	6.3	15	18.8	18	14.1	4	16.0	14	13.6

* Significantly smaller than expected on the basis of its share of large non-instrument/electrical engineering plants (.05 level Chi Square Test).

NOTES

1. Large - 300 or more employees at maximum employment.
2. Small - under 300 employees at maximum employment.
3. Engineering - mechanical, instrument and electrical engineering.
4. Clydeside - Glasgow, Lanarkshire, Dunbartonshire, Renfrewshire, excluding East Kilbride and Cumbernauld.
5. Glasgow - the nine city employment exchanges, plus Clydebank, Rutherglen, Cambuslang and Barrhead.

immigrants that arrived in the 1960s. The same is true if only instrument/electrical engineering immigrants are considered, but in neither case is the difference sufficiently pronounced to rule out chance factors from being responsible. Although the argument that Clydeside presents a tarnished image to industrialists which deters them from establishing new plants in the area, is unproven it is pertinent to consider whether or not this may still in fact be true of Glasgow. It is shown in Chapter 10 that West Central Scotland's poor record of industrial attraction in the 1960s is essentially a Glasgow phenomenon and that the rest of the region performed reasonably satisfactorily. Consequently, it could be that the city rather than the region as a whole suffers from an adverse image.

There is in fact evidence to support such a hypothesis because Glasgow's share of the large instrument/electrical engineering immigrants is significantly (.05 level) smaller than its share of other large establishments (Table 8.3). It might be argued that other factors, such as a tighter female labour supply, could be responsible for this industry avoiding Glasgow, but as there is no evidence whatsoever that large clothing establishments were more averse than other large plants to a Glasgow location it seems reasonable to dismiss this as the explanation. Similarly, a shortage of attractive industrial sites and modern factories in the city could be held responsible since it was shown previously that the instrument/electrical engineering industry was particularly attracted by such factors.

However, this does not seem to provide a full explanation as the city was ranked seventh and ninth respectively in terms of advance factory space built and new industrial estate acreage in the post-1960 period, whereas it ranked only eleventh when the number of jobs in these particular immigrant industries are considered. In addition, the city failed to attract a share of the large instrument/electrical engineering immigrants commensurate with its share of other large plants even in the period 1945-59, when it was relatively competitive as far as the availability of sites and factories was concerned (Table 8.3). This supports the argument that the city's unfavourable reputation is responsible for an aversion amongst large establishments, particularly in the

instrument/electrical engineering industry, to locate in the city. The fact that there is no evidence that small units in the same industry avoided the city shows that there is both a size and an industry component operating, as the hypothesis predicts. Either feature on its own would be insufficient to accept the hypothesis.

In marked contrast, the new towns appear to offer an environment which is favourably perceived by incoming industrialists and they avoid most of those unfortunate features which were identified as afflicting Glasgow. For the hypothesis to be correct, engineering establishments should be significantly over-represented in the new towns. Table 8.4 provides clear evidence that this is the case, as the new towns attracted one in three of all large engineering plants but only about one in seven of other large immigrants. This finding, however, does not rule out cost rather than non-pecuniary considerations from being responsible. The new towns were particularly well provided with industrial sites and advance factories, and as these were important inducements to engineering firms, particularly instrument/electrical engineering ones, it might be expected that such industries would be prominent amongst the new town immigrants.

In order to standardise for this variable the immigrant establishments locating in the new towns were compared with those locating on SIEC and local authority industrial estates. This confirmed the previous finding, with the new towns attracting a higher share of the large immigrant engineering plants than other industrial estates (Table 8.4). The fact that a size, as well as an industry, component is operating can also be seen in the table, with the new towns, unlike the other industrial estates, attracting a significantly higher proportion of large engineering plants than small ones. This corroborates the hypothesis that large engineering plants, particularly in the instrument/electrical sector, display the greatest propensity to move to areas with a favourable environment and to avoid places with poor reputations.

TABLE 8.4 THE INFLUENCE OF THE NEW TOWNS' IMAGE ON THEIR ATTRACTION TO IMMIGRANT INDUSTRY

(a) Share of Large Immigrant Plants - Engineering and All Industries (1952-70)

Type of Plant	No	%
Large Engineering Plants	14	32.6
Large Non-engineering Plants	7	13.5
All Plants	21	22.1

(b) Share of Large Immigrant Plants that Located on Industrial Estates - Engineering and All Industries (1952-70)

Type of Plant	New Towns		Other Estates	
	No	%	No	%
Large Engineering Plants	14*	53.8*	12	46.2
Large Non-engineering Plants	7	35.0	13	65.0
All Large Plants	21	45.7	25	54.3

(c) Share of Large and Small Engineering Plants on Industrial Estates (1952-70)

Type of Plant	New Towns		Other Estates	
	No	%	No	%
Large Engineering Plants	14$^{\emptyset}$	53.8$^{\emptyset}$	12	46.2
Small Engineering Plants	13	27.7	34	72.3
All Engineering Plants	27	42.9	36	57.1

* Significantly larger than expected on the basis of their share of large non-engineering plants (.05 level Chi Square test).

$^{\emptyset}$ Significantly larger than expected on the basis of their share of small engineering plants (.05 level Chi Square test).

CHAPTER 9

THE INFLUENCE OF LOCAL AUTHORITY ACTIVITY ON THE LOCATION DECISION

9.1 THE EFFECT OF LOCAL AUTHORITY ACTIVITY ON INDUSTRY'S COSTS

The activities of local authorities can be readily incorporated within a cost minimising location model since there are various ways in which local authorities can lower costs for incoming industry. It is possible for them to adopt a number of policy measures which can contribute to a reduction in the cost of any, or even all, of the factors of production.

The availability of "key worker" housing may reduce the financial incentives which a firm has to provide in order either to entice its existing skilled workers to move or to attract such labour from elsewhere. The provision of serviced industrial sites and advance factories lowers the cost of land and fixed capital. A flexible option on future development land held by a local authority at no cost to the company concerned, but for its longer term expansion, effectively provides a continuous subsidy for a firm's land costs. The local authority not only lose revenue from the site, but they also run the risk that if the time fixed option is not taken up, then the land will have been sterilised to no avail. However, Cameron and Clark (1966) found that "the provision of free but time-dated option was one of the most significant inducements to a company which was expanding output ..... Indeed this was regarded as something of an assurance that the local authority would remain genuinely interested in the company's progress on the site".

Since personal considerations can determine the choice of location within the spatial profit margins, it is apparent that local authorities can influence the decision. They can lower the effective cost of enterprise within their boundaries by helping to reduce psychic costs and therefore the marginal financial compensation a firm has to pay to attract high quality management to the area concerned. This might be achieved by undertaking environmental improvement or conservation schemes, encouraging local social and cultural activities, or by displaying an ability and willingness to assist a firm in its new location. This might be done by the speedy and flexible handling of its planning application in order to reduce delays and therefore costs. The ILAG survey (1973) found, for instance, that "regions and towns endeavouring to attract industry can, and very often do, help firms in a way which they will not forget".

9.2 EVIDENCE FOR THE IMPACT OF LOCAL AUTHORITY ACTION ON LOCATION DECISIONS

There is strong empirical evidence to suggest that local authorities frequently exert an important influence on location decisions. In the ILAG survey, 39% of immigrant firms to Scotland considered that the efforts of local authorities were a major factor and a further 36% thought it a minor factor in their location decision-making, although it was rarely the outstanding single reason. Cameron and Clark (1966) had similar findings: "almost six out of every ten companies mentioned that the co-operation of the local authority had influenced them in their selection of a particular site". In fact, they identified local authority assistance as one of the three factors of particular importance on the location decision. They concluded that "the lack of co-operation at the decision stage, or the impression given of being one industrialist amongst hundreds who visited the site, acted as a distinct reason for not establishing a unit".

Local initiative is most effective if it fulfils two criteria. Firstly, it brings the local area to the attention of outside industry by means of industrial promotion campaigns. Secondly,

and more importantly, it is able to offer positive inducements to incoming industry in the form of the cost reducing measures discussed above. The former without the latter seems to result in much wasted time and money. The efforts of government to steer new industry to an area will be undermined in the absence of local initiative since, as Klaasen (1967) has pointed out, "all the help in the world will not redevelop an area which does not take the initiative itself. Local leadership, local government, local resources, local business, local labour - these are the only bases on which a sound redevelopment can be based".

9.3 INDUSTRIAL DEVELOPMENT POWERS AVAILABLE TO LOCAL AUTHORITIES

The ability of local authorities to partake in the industrial development process stems from a series of legislative Acts. Local planning authorities' powers to provide serviced sites and industrial buildings originated under Section 19 of the Town and Country Planning (Scotland) Act of 1947. These powers were extended to burghs which were not planning authorities if they drew up a Town Development Scheme, approved by the Secretary of State for Scotland, under Section 10 of the Housing and Development (Scotland) Act of 1957. The Schemes were available to authorities which made overspill agreements with Glasgow. The powers available allowed town councils to develop land for industrial purposes and to build factories. All local authorities, irrespective of overspill agreements, were subsequently granted these powers under the Local Government (Development and Finance) (Scotland) Act of 1964. Additional discretionary powers were granted to enable local authorities to give 75% loans towards the cost of constructing factories, provided they obtain borrowing consent from the Secretary of State for Scotland. The loans have to be recovered within a thirty year period, which means that economic rents are charged.

9.4 THE SPATIAL IMPACT OF LOCAL AUTHORITY ACTIVITY

In order to determine whether local authority initiative and assistance to mobile industry has been greater in one part of Scotland than another, it is necessary to find some criteria against which their performance can be measured. If it can be shown that local authorities in the East of Scotland in general adopted a more positive approach to the needs of industry than those in the West, it seems likely, based on other empirical findings, that this could make an important contribution to explaining the relative failure of West Central Scotland to attract immigrant industry once Assisted Area status was extended to most of Scotland.

9.4.1 Advance Factory Building by Local Authorities

One suggested measure of the dynamism of a local authority's industrial development effort is the amount of advance factory space built, since this signifies a willingness on the part of the local authority to risk its money trying to offer a positive inducement to industry. The pattern of advance factory building supports the idea of a relatively dynamic East and relatively cautious West of Scotland. Between 1960 and 1970 about 886,500 sq ft of advance space was built by local authorities (excluding the new towns) and of this total about 42% was in the East Central region and 19% in the Falkirk/Stirling region.

Table 9.1 compares the share of local authority advance factory building in each region with its share of Scotland's insured employees and the efforts of the East Central and Falkirk/Stirling regions can clearly be seen. They contrast with the West Central region, which had about half the insured employees, but whose local authorities built under one-third of the new advance floorspace constructed by Scottish local authorities during the 1960s. In fact, West Central's advance factory building owed little to its local authorities, who built only about 11% of the new floorspace between 1966 and 1970. The dearth was particularly marked in the Clydeside conurbation, where no single-storey advance factories

TABLE 9.1 LOCAL AUTHORITY ADVANCE FACTORY BUILDING 1960-70

Period	Region	Advance Factory Space		% of Scottish Insured Employees
		000 sq ft	%	
1960-65	W. Central Scotland	53.5	64.5	50.8
	Falkirk/ Stirling	10.6	12.8	5.0
	E. Central Scotland	18.8	22.7	19.4
	Tayside	-	-	8.7
	Borders	-	-	2.0
	South West	-	-	2.5
	North East	-	-	7.5
	Highlands	-	-	4.1
	Scotland	82.9	100.0	100.0
1966-70	W. Central Scotland	222.6	27.7	50.6
	Falkirk/ Stirling	155.0	19.3	5.1
	E. Central Scotland	352.0	43.8	19.7
	Tayside	10.0	1.2	8.7
	Borders	14.0	1.8	2.0
	South West	30.0	3.7	2.3
	North East	20.0	2.5	7.5
	Highlands	-	-	4.1
	Scotland	803.6	100.0	100.0

at all were built by the local authorities. Most of the space was built by only three authorities in the outer part of the region, namely Irvine and Greenock burghs and Dunbarton county. All the counties in East Central, and particularly Fife and West Lothian, were active in building advance factories, and they were enthusiastically supported by burghs such as Kirkcaldy and Whitburn. The impressive performance from the Falkirk/Stirling region was largely attributable to the two small burghs of Grangemouth and Denny. Amongst noteworthy performances from small authorities in the rest of Scotland, the efforts of Girvan burgh are particularly outstanding.

The local authorities, like the new towns and unlike SIEC, concentrated on building nest factory units. Nearly two-thirds of their factories were smaller than 10,000 sq ft, and in fact only two factories larger than 30,000 sq ft were built. Their letting policies appear to have been more akin to SIEC's than to those of the new towns, with a preference being shown for manufacturing establishments, although they sought firms new to their area rather than to Scotland in general. A number of authorities, such as West Lothian, Midlothian and Irvine, benefitted from industrial decentralisation out of Edinburgh and Glasgow. Their policies were intermediate between those of SIEC and the new towns and this is reflected in the fact that the proportion (53%) of local authority advance factory floorspace initially occupied by immigrant firms lay between that experienced by SIEC (68%) and by the new towns (29%).

9.4.2 Industrial Estate Development by Local Authorities

An alternative and less stringent measure of local authority attitudes towards industrial growth relates to the development of industrial sites. It seems a reasonable assumption that an authority prepared to devote resources to servicing an industrial estate has an interest in industrial development. Once again local authorities in the East of Scotland, particularly the counties and burghs of Fife and West Lothian, have been especially active, whether assessed in terms of the number of estates

developed, their acreage, or the number of authorities involved (Table 7.6). By 1970 they had developed four times as much industrial estate acreage as the larger authorities in the West of Scotland.

It must be admitted, however, that this is an imperfect measure in that some larger authorities, especially in West Central, despite developing small estates of their own, were not noticeable for their active industrial development policies. On the other hand, an authority lacking its own estates may prove active in trying to attract industry to SIEC sites within its boundaries. An excellent example is Cumnock burgh, which abandoned its own plans to develop an industrial estate on discovering that SIEC was interested in the same site, but it has vigorously pursued an industrial development policy. As in so many cases (eg Cumnock, Denny, Girvan, Whitburn), the driving force behind a small burgh's efforts in self-help has been a prominent personality on the permanent staff, usually the town clerk.

9.4.3 Identifying the Active Local Authorities

The local authorities in each region can be classified as "active" or "inactive", depending upon whether or not they undertook industrial estate or advance factory building. The maximum number of potentially active authorities in any area consists of all the counties, plus large burghs, plus small burghs. The active authorities are shown in Table 9.2 as a percentage of the total, although this takes no account of the importance of each individual authority. If it is assumed that importance equates with population size then the figures can be weighted by population.

The unfavourable competitive position of the West compared with the East end of the central belt is clear, especially in the case of higher risk activities such as advance factory building. For example, when weighted by size, one in three of the authorities in the East were active, despite the fact that the largest one, Edinburgh, with 47% of the region's population, built no advance factories. By contrast, only one in eleven of the local authorities in the West were active (Table 9.2).

TABLE 9.2 LOCAL AUTHORITY CO-OPERATION 1960-70

Method 1 - Industrial Estate Development

Region	Weighted by Population		Unweighted		Mean Rank	Overall	Mean %	Rank
	% Active	Rank	% Active	Rank				
W. Central Scotland	54.8	4	28.0	3	3.5	3.5	41.4	3
Falkirk/ Stirling	18.0	7	27.0	4	5.5	5	22.5	6
E. Central Scotland	89.5	1	48.0	1	1	1	68.7	1
Tayside	52.0	5	8.0	8	6.5	7	29.0	5
Borders	61.3	3	47.0	2	2.5	2	54.1	2
South West	10.2	8	11.0	5	6.5	7	10.6	8
North East	66.0	2	11.0	5	3.5	3.5	38.5	4
Highlands	27.7	6	17.0	7	6.5	7	22.3	7

Method 2 - Advance Factory Building

Region	Weighted by Population		Unweighted		Mean Rank	Overall	Mean %	Rank
	% Active	Rank	% Active	Rank				
W. Central Scotland	9.1	5	13.0	4	4.5	5	11.0	5
Falkirk/ Stirling	18.0	4	27.0	2	3	2.5	22.5	3
E. Central Scotland	33.1	3	26.0	3	3	2.5	29.5	2
Tayside	8.8	6	3.0	6	6	6.5	5.9	6
Borders	37.5	2	29.0	1	1.5	1	33.2	1
South West	4.0	7	5.0	5	6	6.5	4.5	7
North East	40.9	1	3.0	6	3.5	4	22.0	4
Highlands	0.0	8	0.0	8	8	8	0.0	8

NB For definitions see text.

Various ways are shown of comparing the regions but it is suggested that the most satisfactory method is to take the mean of the weighted and unweignted percentages (column 6) and then rank the results (column 7). If this is done for both the industrial estate and advance factory indices tne strong competitive position of the East Central and Border regions is apparent.

It could be argued that the way local authority activity is measured results in a bias against West Central, where, as a result of priority from SIEC, there was less need for local authorities to develop their own sites and factories. The local authorities could have been active in support of SIEC developments by offering key worker housing, undertaking promotional campaigns and assisting industrialists wno came to look at sites or factories in the town, as was done by Cumnock, for example. Although there is truth in this, it can equally be argued that there was scope for many local authorities to undertake their own developments to supplement those by SIEC, as is illustrated by towns such as Dundee, Greenock, Kirkcaldy, Irvine, Leven and Girvan and by counties such as Fife and Dunbartonshire, who all developed their own estates in the vicinity of SIEC ones.

There is, after all, a need for sites to supplement those of SIEC in order to meet a wider demand. Local authorities can cater for the needs of relocating industry and distribution depots, repair centres and other non-manufacturing uses as well as incoming industry. The potential for additional activity to that of SIEC has been illustrated by private developers, who in fact have concentrated on Glasgow and North Lanarkshire, where local authorities, in the study period, were slow to take an initiative. Therefore the fact that many authorities in the West of Scotland have been less active in the field of industrial development than their counterparts in East Scotland cannot be satisfactorily explained by the argument that SIEC activity rendered additional efforts unnecessary. In fact by 1970 tne local authorities in tne East of Scotland possessed a larger acreage of industrial estates than SIEC had in the West.

9.5 SUMMARY

Increasing priority was devoted to industrial promotion and development by local authorities in the course of the 1960s. In a situation where there are a large number of places competing for a limited amount of mobile industry, those authorities giving little priority to the needs of industry are likely to draw attention to the fact by failing to attract a volume of new industry commensurate with the potential or the resources of their area. Differences in the attitudes of local authorities in the West and East of Scotland, at least until 1970, were very pronounced and it seems unlikely to be a coincidence that the locations selected by incoming industry reflected the competitive advantage enjoyed by the eastern part of the central belt.

CHAPTER 10

SCOTTISH CITIES AND THEIR ATTRACTION TO IMMIGRANT INDUSTRY

The Scottish cities of Glasgow, Edinburgh, Dundee and Aberdeen have been referred to on a number of occasions in previous chapters, but it is now proposed to bring the information together in a more coherent and comprehensive fashion.

10.1 THE AMOUNT OF INDUSTRY ATTRACTED BY THE CITIES

The number of immigrant establishments moving to the cities and the employment they provided is set out in Table 10.1. Glasgow has consistently attracted more establishments that the three other cities combined, and only in the 1945-51 period did these plants provide fewer jobs than in all the other cities. This single exception arose from the success of Dundee in attracting two very large American companies, NCR and Timex.

By 1970 immigrant firms were employing 9,700 people in Glasgow, although at their maximum they employed about 18,300 people. Therefore in 1970 only about 7% of the city's manufacturing employment was provided by incoming establishments; this compares adversely with the figure of 34% (12,960 jobs) in Dundee. In contrast, neither Edinburgh nor Aberdeen, with about 490 and 200 jobs respectively, was successful in attracting incoming firms.

TABLE 10.1 SCOTTISH CITIES AND THEIR REGIONS - IMMIGRANT INDUSTRY ATTRACTED IN EACH PERIOD

Period	Area	Estabs	Employment		Average Size (max)
			Max	1970	
1945-51	Glasgow	30	8,330	3,480	278
	Rest of W. Central	79	36,740	25,360	465
	Edinburgh	5	570	130	114
	Rest of E. Central	4	830	270	207
	Dundee	11	14,110	12,230	1,283
	Rest of Tayside	4	420	80	105
	Aberdeen	1	20	10	18
	Rest of North East	2	1,440	1,360	721
1952-59	Glasgow	12	7,040	4,490	586
	Rest of W. Central	34	15,990	12,470	470
	Edinburgh	4	420	360	105
	Rest of E. Central	4	1,370	1,190	342
	Dundee	4	680	480	169
	Rest of Tayside	3	570	410	190
	Aberdeen	-	-	-	-
	Rest of North East	2	990	990	445
1960-65	Glasgow	9	1,100	420	122
	Rest of W. Central	68	21,200	15,170	312
	Edinburgh	-	-	-	-
	Rest of E. Central	35	14,680	13,000	420
	Dundee	1	210	170	207
	Rest of Tayside	3	290	280	97
	Aberdeen	-	-	-	-
	Rest of North East	2	50	30	24
1966-70	Glasgow	13	1,880	1,310	144
	Rest of W. Central	50	7,310	5,100	146
	Edinburgh	-	-	-	-
	Rest of E. Central	49	8,650	7,300	176
	Dundee	1	80	60	81
	Rest of Tayside	5	600	450	119
	Aberdeen	2	280	200	139
	Rest of North East	6	380	330	63
1945-70	Glasgow	64	18,340	9,770	287
	Rest of W. Central	231	81,230	58,110	352
	Edinburgh	9	990	490	110
	Rest of E. Central	92	25,530	21,770	277
	Dundee	17	15,080	12,960	887
	Rest of Tayside	15	1,880	1,220	125
	Aberdeen	3	300	210	99
	Rest of North East	12	2,860	2,710	238

The flow of mobile industry varied over time. Glasgow's share of incoming employment declined sharply after 1960 (Table 10.2) and Edinburgh attracted no new firms at all at this time. Dundee never came near to repeating its immediate post-war success in obtaining new industry and Aberdeen attracted only three plants throughout the whole period (Table 10.1).

These basic figures provide little indication as to whether or not the cities proved particularly successful in obtaining new industry and they need to be set into some sort of context. This is done in Table 10.2 by comparing each city's actual amount of immigrant industry in each period with a notional expected volume based on its share of Scottish unemployment. A number of interesting features are revealed in these tables. With the exception of Dundee between 1945 and 1951, each city attracted fewer jobs in every period than might reasonably have been expected on the basis of its labour supply or need, as measured by its unemployment.

Glasgow stands out for the sheer size of its notional employment deficit. On the criteria adopted the city attracted 28,500 fewer immigrant jobs than might have been expected by 1970 (Table 10.2). Its most successful period was 1952-59, when nearly one in four of all incoming jobs was in the city. Although still below the expected level, the shortfall of 2,200/2,500 jobs was significantly less than in any other period. Dundee was the only city which by 1970 had successfully attracted a notional excess number of jobs (Table 10.2).

The cities also displayed different trends from those shown by their surrounding regions in the inflow of immigrant industry. Table 10.3 shows that both Dundee and Edinburgh experienced a steady fall in their share of the region's incoming employment. This contrasts with the sudden increase in Aberdeen after 1965 and the fluctuations in Glasgow's share, which ranged from a maximum of about 30% in the 1950s down to only about 5% in the early 1960s.

When the cities are removed from the regional totals it becomes evident that a city rather than regional factor frequently appears to be operating. Table 10.4 shows that West Central, unlike Glasgow, experienced a notional surplus of jobs up until 1965,

TABLE 10.2 SCOTTISH CITIES - ACTUAL AND NOTIONAL EXPECTED EMMIGRANT INDUSTRY EMPLOYMENT

City	% of Scottish Unemp	Employment		Maximum Employment			1970 Employment		
		% of Max	% of 1970	Expected	Actual	Difference	Expected	Actual	Difference
1945-51									
Glasgow	38.4	13.2	8.1	24,300	8,330	-15,970	16,570	3,480	-13,090
Edinburgh	6.2	0.9	0.3	3,900	570	- 3,330	2,680	130	- 2,550
Dundee	4.3	22.4	28.3	2,710	14,110	+11,400	1,860	12,230	+10,370
Aberdeen	3.1	*	*	1,950	20	- 1,930	1,340	10	- 1,330
1952-59									
Glasgow	31.0	23.6	20.1	9,260	7,040	- 2,220	6,940	4,490	- 2,450
Edinburgh	8.3	1.4	1.6	2,480	420	- 2,060	1,860	360	- 1,500
Dundee	4.7	2.3	2.1	1,400	680	- 720	1,050	480	- 570
Aberdeen	4.1	-	-	1,220	-	- 1,220	920	-	- 920
1960-65									
Glasgow	30.2	2.8	1.4	12,010	1,100	-10,910	9,330	420	- 8,910
Edinburgh	4.9	-	-	1,950	-	- 1,950	1,510	-	- 1,510
Dundee	3.7	0.5	0.6	1,470	210	- 1,260	1,140	170	- 970
Aberdeen	3.3	-	-	1,310	-	- 1,310	1,020	-	- 1,020
1966-70									
Glasgow	28.3	7.7	6.9	6,900	1,880	- 5,020	5,390	1,310	- 4,080
Edinburgh	4.7	-	-	1,140	-	- 1,140	890	-	- 890
Dundee	3.5	0.3	0.3	850	80	- 770	670	60	- 610
Aberdeen	2.4	1.1	1.0	580	280	- 300	460	200	- 260

Period	City	1970 Employment		
		Expected	Actual	Difference
1945-70	Glasgow	38,240	9,700	-28,540
	Edinburgh	6,940	490	- 6,450
	Dundee	4,720	12,940	+ 8,220
	Aberdeen	3,730	200	- 3,530

* less than 0.1%

TABLE 10.3 SCOTTISH CITIES' SHARE OF THEIR REGIONS' INCOMING EMPLOYMENT

Period	City	% of Unemp	% of Employment	
			Max	1970
1945-51	Glasgow	54.6	18.5	12.1
	Edinburgh	59.6	40.8	3.3
	Dundee	72.4	97.1	99.4
	Aberdeen	58.2	1.2	0.7
1952-59	Glasgow	53.2	30.1	26.5
	Edinburgh	57.1	23.5	23.0
	Dundee	72.9	54.3	54.2
	Aberdeen	52.5	-	-
1960-65	Glasgow	47.7	4.9	2.7
	Edinburgh	34.0	-	-
	Dundee	63.1	41.5	37.8
	Aberdeen	57.8	-	-
1966-70	Glasgow	48.0	20.4	20.4
	Edinburgh	33.3	-	-
	Dundee	52.0	11.9	11.5
	Aberdeen	42.0	42.3	37.5

TABLE 10.4 EACH REGION'S ACTUAL AND EXPECTED INCOMING EMPLOYMENT WHEN THEIR CITIES ARE EXCLUDED

Period	Region (excl city)	Share (%) of jobs		No of jobs (max)		Difference
		Expected	Actual	Expected	Actual	
1945-51	W. Central	31.8	58.3	20,040	36,740	+16,700
	E. Central	4.2	1.3	2,650	830	- 1,820
	Tayside	1.7	0.7	1,070	420	- 650
	North East	2.2	2.3	1,390	1,440	+ 50
1952-59	W. Central	27.3	53.6	8,150	15,990	+ 7,840
	E. Central	6.3	4.6	1,880	1,370	- 510
	Tayside	1.8	1.9	540	570	+ 30
	North East	3.8	3.3	1,130	990	- 140
1960-65	W. Central	33.1	53.3	13,160	21,200	+ 8,040
	E. Central	9.5	36.9	3,780	14,680	+10,900
	Tayside	2.0	0.7	790	290	- 500
	North East	2.3	0.1	920	50	- 870
1966-70	W. Central	30.7	30.0	7,480	7,310	- 170
	E. Central	9.7	35.5	2,360	8,650	+ 6,290
	Tayside	2.2	2.5	540	600	+ 60
	North East	3.2	1.6	780	380	- 400

after which it attracted the expected number of jobs. It is therefore more accurate to refer to an urban or metropolitan, rather than regional, problem in the West of Scotland as far as the attraction of immigrant industry is concerned.

In the East of Scotland the region's appeal to incoming firms after 1960 can be entirely attributed to the area outside Edinburgh, whereas in North East Scotland both the city and region experienced persistent deficits in the 1960s.

10.2 THE CHARACTERISTICS OF THE CITIES' IMMIGRANT PLANTS

The cities, despite their large and concentrated labour markets, failed to attract the really large establishments and, with the exception of Dundee, the average size of each unit was smaller than in the surrounding region (Table 10.1). In Glasgow's case only in the 1950s did this situation fail to hold and this lends support to the argument that this was the city's most successful period. The probable explanation is that the cities lacked the extensive sites required by the largest employers and this is considered further in section 10.3.4.

The fact that Edinburgh and Aberdeen attracted very few incoming concerns and that this was also true of Dundee, except for the immediate post-war period, means that the analysis concentrates on Glasgow. One of its distinctive, albeit unfortunate, features is that immigrant firms in the city displayed a poorer growth record than anywhere else, when employment is compared at the end of each period and in 1970. In Table 10.5 every other area with a relatively large number of jobs (defined as more than 500 at either date) experienced a strong increase in employment amongst its immigrants. In contrast, in Glasgow employment actually declined, with the exception of the 1952-59 immigrants, and even their employment only remained static. Therefore Glasgow not only failed to attract its notional expected number of jobs, but those firms which came seem to have been amongst the most unsuccessful. Several of the city's largest immigrants subsequently closed, notably Remington Rand, Remington Electric Shavers, Voith Engineering, AEI and Goujon Paper Togs.

TABLE 10.5 EMPLOYMENT GROWTH IN GLASGOW AND OTHER AREAS WHICH ATTRACTED MORE THAN 500 INCOMING JOBS

Area	Employment growth between end of period and 1970 (% change)		
	1951/70	1959/70	1965/70
Glasgow	- 38.0	+ 0.4	- 57.0
Lanarkshire	+ 82.3	+ 83.1	+ 48.0
Dunbartonshire	+ 103.3	+ 172.5	+ 154.9
Renfrewshire	+ 433.6	+ 39.6	+ 41.1
Ayrshire	+ 55.5	+ 717.2	+ 110.5
Stirling/ Clackmannanshire	+ 623.7	+ 19.1	+ 56.6
West Lothian			+ 9.4
East Lothian		+ 318.3	
Fife		+ 295.1	+ 153.5
Wigtown/ Kirkcudbrightshire			+ 210.8
Dundee	+ 198.7		
Aberdeenshire	+1,216.5	+ 216.1	

NOTE: Only areas attracting more than 500 immigrant jobs in any period are shown.

10.3 EXPLAINING THE TRENDS

10.3.1 Accessibility Factors

There is no reason for thinking that accessibility disadvantages, at least for Edinburgh and Glasgow, have contributed to their failure to attract the expected volume of industry. Both cities are in the central belt close to ports and certain specialised business services. Glasgow is particularly favourably placed because it is at the core of a major industrial region with many suppliers and sub-contractors and it is the focus for both intra and inter-regional transport routes. In the case of Dundee and more especially Aberdeen, their distance from markets, suppliers and the country's main industrial centres is likely to be a deterrent to incoming industry. Certainly this was the main drawback to a location in both Dundee and Aberdeen identified by the Tayside Study (1970) and by Livesey (1961). It does not however explain why Aberdeen never managed to obtain as much industry as its surrounding region, nor why Dundee, only twenty miles from the successful town of Glenrothes, failed to attract an equivalent amount of new industry.

10.3.2 Government Policy

Both Glasgow and Dundee benefitted from government regional policy throughout the post-war period, enjoying continuous Assisted Area status. On the other hand, Edinburgh received no such advantage and from 1966 was the only part of Scotland excluded from the Development Area. This prevented it from obtaining any government factories or industrial estates and firms moving to the city were never eligible for financial assistance. Consequently the city has been at a cost disadvantage compared with elsewhere in central Scotland and it is hardly surprising that no firms came to Edinburgh in the 1960s.

Aberdeen was designated a Development District in 1960 but this brought little apparent advantage as far as mobile industry was concerned. None came between 1960 and 1965 and then only 280 jobs

arrived in the latter part of the decade. The small volume of industry moving into both Glasgow and Dundee at this time is further proof that Assisted Area status on its own is insufficient to attract new industry in the absence of other necessary factor inputs.

The Springburn Study (1966) took the view that neither Glasgow nor Edinburgh has benefitted from government policy as much as might have been expected. The study felt that "existing policies sometimes give an unfortunate impression of ignoring the very existence of Scotland's two largest cities and of writing off the traditional contributions which such areas make to economic growth". Evidence for this view was held to be the omission by the Scottish Office of both cities from the 1963 Growth Areas (Cmnd 2188) and the lack of planning studies concerned with the economic growth of the cities. The Board of Trade, who were responsible for distribution of industry policy, saw their spatial priorities in terms of the different categories of Assisted Area and, apart from differences in advance factory and industrial estate development programmes, no attempt was made to discriminate in favour of any particular locations within the designated areas. The Springburn Study also suggested that in some respects Glasgow might not even have been accorded equal treatment since "steering organisations must often feel compelled to show only the best of their wares in order to stake the best possible bid for the country as a whole". This meant Glasgow was likely to be excluded.

There was also a conflict in the local authority's planning policy between the city's physical and economic planning needs (Springburn Study, 1966). The policy of population and industrial overspill had its roots in the Clyde Valley Regional Plan (1946) and this had suggested that new industry should be allowed into the "congested area" only if it was proved essential for it to be closely dependent on the city's facilities. The combination of central government Growth Area policy and the local authority overspill policy led the Economist (1965) to conclude that Glasgow had to take second place to the new towns and other growth areas in competing for incoming industry.

10.3.3 The Availability of Labour

In terms of labour availability the cities in general and Glasgow in particular should have enjoyed advantages over other competing areas as a result of their large labour markets. It has already been pointed out that, apart from Dundee prior to 1951, all the cities failed to attract the amount of industry commensurate with their share of Scotland's labour supply, as measured by their unemployment. There are two explanations for this. Either the labour supply advantages are more apparent than real or else they are offset by the poor quality of some of the cities' other resources. The latter possibility is examined elsewhere in this chapter, but the former consideration does appear to be of some relevance.

The shift in demand from male to female labour worked to the cities' disadvantage since their share of Scottish unemployment was higher for male than for female labour. In addition the labour market was relatively slacker for male labour, which experienced higher rates of unemployment. In fact Cameron (1971) has suggested that one reason for Clydeside's declining share of mobile industry has been the relative tightness of the female labour market, which may have encouraged firms in predominantly female employing industries to seek locations in the East of Scotland. Edinburgh, however, would prove an exception because as the Lothians Regional Survey and Plan (1966) pointed out there were signs that at least some expansion may have been discouraged by a shortage of semi-skilled female labour.

There is also evidence that the cities' labour supply advantages declined relative to those of their regions, reflecting in part the changing population distribution as overspill and new town programmes proceeded. Until about 1960 Glasgow and Edinburgh had more unemployed than their regions, but this was no longer true in the 1960s when their share of incoming industry declined noticeably. In Aberdeen this reversal occurred in the mid-1960s and although Dundee continued to have more unemployed than Tayside it moved from a position of two and a half times as many after the war to only 17% more by 1966.

10.3.4 The Availability of Sites and Premises

A major reason for the cities' comparative failure to attract new industry has been a shortage of suitable sites and factories. This is best illustrated by Glasgow, which was the largest and potentially the most attractive of the cities.

The shortage is a long standing and persistent one. As long ago as 1946 the Clyde Valley Regional Plan stressed the "lack of space available in the central urban area, both for new industry and for the normal expansion of existing factories and works". The post-war government industrial estates and advance factories helped to ease the situation and by 1951 the city had 490 acres of industrial estates and 857,000 sq ft of new advance floorspace. Such developments made an important contribution to the city's ability to attract 5,600 new jobs at this time. Nevertheless the city remained deficient in supplies of land and modern premises. By 1959 this was causing concern to Glasgow Corporation, who pointed out the limited and decreasing reserves of suitably vacant industrially zoned sites within the city.

The position was so serious that the Springburn Study (1966) was convinced that the shortage was the cause of Glasgow's failure to attract new industry. According to the Study, "although Glasgow has probably more to offer the industrialist as regards labour availability, communications, sub-contracting capacity and educational and training facilities than any other location in Scotland, it has least to offer from the point of view of industrial sites and premises". If this problem could be remedied the Study saw no reason why the city's potential should not be realised.

The same difficulty seems to have occurred in the other cities, especially in the 1960s when their existing industrial estates were nearly fully occupied. The Lothians Regional Survey and Plan (1966), for instance, pointed out that the shortage of sites in Edinburgh severely reduced its appeal to mobile industry. Table 10.6 shows the new industrial estates and new advance factories developed in the cities during each period. Its main feature is the dramatic deterioration after 1960 in the cities' comparative position. Their share of new industrial estate acreage slumped from about half the Scottish total to about 6% by 1970.

TABLE 10.6 INDUSTRIAL ESTATE AND ADVANCE FACTORY BUILDING IN THE SCOTTISH CITIES 1945-70

Period	City	Ind Est acreage (max effect)	% of Scottish total acreage	Advance factory space built (000 sq ft)	% of Scottish advance factory space	% of Scottish unemp
1945-51	Glasgow	490	40.6	856.8	37.6	38.4
	Edinburgh	-	-	-	-	6.2
	Dundee	125	10.4	66.8	2.9	4.3
	Aberdeen	-	-	-	-	3.1
1952-59	Glasgow	490	27.8	-	-	31.0
	Edinburgh	120	6.8	-	-	8.3
	Dundee	125	7.1	-	-	4.7
	Aberdeen	30	1.7	-	-	4.1
1960-65	Glasgow	64	2.1	51.6	3.0	30.2
	Edinburgh	120	3.9	-	-	4.9
	Dundee	-	-	-	-	3.7
	Aberdeen	30	1.0	18.8	1.1	3.3
1966-70	Glasgow	146	2.8	161.7	4.3	28.3
	Edinburgh	-	-	-	-	4.7
	Dundee	127	2.5	74.2	2.0	3.5
	Aberdeen	39	0.8	63.0	1.7	2.4

Glasgow, and to a lesser extent Dundee, are largely responsible for this situation. Until 1960 both cities had a level of site and advance factory provision commensurate with or greater than that expected on the basis of their share of unemployment. After this time, however, few advance factories were built and little new land was developed on industrial estates. The decline in Glasgow's share of the total provision in Scotland can be seen in Table 10.6; the new advance factory floorpace, for example, built in the 1960s was only about one-quarter of that developed in the city immediately after the war. Given this transformation in its competitive position it is hardly surprising that Glasgow's share of incoming industry should fall so steeply in the 1960s, although it is noticeable that the slight improvement after 1965 coincided with an increase in advance factory and industrial estate development.

No advance factories were ever constructed in Edinburgh and the amount of industrial land was consistently less than expected on the basis of its unemployment. Similarly, Aberdeen's need for sites and buildings was never adequately catered for (Table 10.6). These shortages were reflected in the persistent notional deficit of incoming industry throughout the post-war period.

Any advantages the cities enjoyed from their large labour markets were of no consequence if immigrant firms were unable to find a serviced site or modern premises available. It is clear that when compared with the new towns, the cities were labouring under considerable difficulties because they lacked comparable site and factory facilities.

10.3.5 The Image of the Cities

It was argued earlier in Chapter 8 that the images projected by the cities were far from uniform, with Glasgow and Edinburgh representing the opposite ends of the spectrum. Evidence was produced to show that Glasgow was viewed unfavourably both as a residential and industrial location, whereas Edinburgh was generally viewed favourably; a fact which Livingston new town, for example,

was expected to capitalise upon. Dundee and Aberdeen seem to have been somewnere between these extremes. Aberdeen's position is somewnat complex in that, as Livesey (1961) points out, it enjoyed good industrial relations, which indicate a favourable economic image, but Gould and White (1968) have shown that it had a relatively poor residential image.

If other things were equal, Edinburgh should have been relatively more successful than Glasgow in attracting new industry. Since this has not occurred and Edinburgh obtained no incoming firms in the 1960s, it is clear that other things have been far from equal. This suggests that on their own an attractive environment and low psychic costs are insufficient to stimulate industrial development. It supports survey findings that image is a subsidiary rather than primary influence on the choice of site. However, as geographical cost differences decline so these lesser location factors increase in importance, provided they retain pronounced cost variations over space. Under such circumstances they are more likely to become the critical marginal determinants of location.

The fact that Edinburgh failed to attract any new firms in the 1960s is, in fact, consistent with this hypothesis. The city remained outwith the Assisted Area and therefore an incoming firm would operate at a cost disadvantage compared with an alternative location elsewnere in the region. The shortage of sites and premises was a further cost deterrent to an Edinburgh location. Before the city's favourable image is likely to operate to its advantage, it has to be competing on a similar cost footing with alternative locations. Clearly this did not occur, and the psychic cost advantages were insufficient to outweigh the other cost penalties. This finding supports the view that cost considerations remain the primary determinant of the general area in which a firm will seek a new location.

In contrast, Glasgow, especially before 1960, enjoyed certain cost advantages in terms of government inducements, sites, factories and labour supply and these were sufficient to attract new industry in spite of the city's poor image. This suggests that cost subsidies can help to outweigh the perceived disadvantages of environmentally deprived areas and render them attractive to a

wider range of mobile industry. However this does not mean that non-economic considerations are irrelevant because despite its cost advantages the city still failed to attract the notional expected amount of industry. When the cost advantages became seriously eroded, as in the 1960s, psychic costs became of increasing significance and the city's share of incoming industry declined sharply. This was particularly pronounced in the case of large engineering plants, which appear to have been strongly influenced by environmental factors (Chapter 8).

The Springburn Study (1966), by ignoring the barrier presented by an unfavourable image, seems to have been too optimistic in assuming that simply by overcoming the shortage of sites and factories Glasgow's full potential to attract new industry could be realised.

10.3.6 Local Authority Assistance

The activities of local authorities can enhance the attraction of their areas for incoming industry, especially by ensuring there is an adequate choice of attractive sites and premises. The efforts of the city authorities can be examined within this particular context, especially in the 1960s when local authorities, facilitated by legislation, generally became more active in the industrial development process.

If government agencies are active then there may be less incentive for city authorities to undertake their own developments; although it was argued in Chapter 9 that local authorities could complement rather than compete with other agencies by catering for a different demand. The method used to assess the efforts of the city authorities is, once again, to identify the notional expected level of industrial estate and advance factory development programmes, on the basis of their unemployment, and in the light of total site and factory development in Scotland.

It has already been pointed out in Table 10.6 that all the cities experienced a shortfall of such facilities and this indicates that

there was scope for the local authorities to adopt more active policies. In fact, on the evidence available, it seems that none of the cities was particularly active in the study period.

The Lothians Regional Survey and Plan (1966), when considering Edinburgh's attitude to incoming industry, concluded that "it may be doubted whether the city authorities ..... have adopted a specially favourable attitude towards industrial development. Edinburgh does not think of itself as an industrial city and so perhaps set itself out to attract industry much less than most other communities".

Much the same might be said of Glasgow, even though it was Scotland's premier industrial city. In the 1960s the local authority was pursuing a policy of population and industrial over-spill so that the needs of industry were not of major concern (Henderson, 1974). No single storey local authority advance factories were built and the only industrial estates were small. The size of the city's needs was beyond the limited resources of SIEC, which had a nationwide remit, and their efforts required supplementing by the local authority. As the Springburn Study (1966) was forced to conclude, "at the moment Glasgow has little to offer newcomers, apart from those relatively small factory units which come up for re-allocation from time to time on the estates of SIEC. Large (and even medium sized) concerns cannot be offered any location in the Glasgow area."

The largest acreage of new industrial estate developed by a city authority in the 1960s was in Dundee, although Aberdeen also built an advance factory on their new estate. Nevertheless such efforts were relatively small compared both with developments elsewhere and with each city's level of unemployment.

10.4 SUMMARY

With the exception of Dundee, none of the Scottish cities had attracted the number of jobs which might have been expected from immigrant firms by 1970. The shortfall was most acute in the

largest city, Glasgow; its share of incoming establishments fell sharply after 1960 and a number of possible explanations for this have been considered. The cost advantages previously enjoyed by Glasgow declined at this time as a result of the extension of the Assisted Area throughout most of Scotland. This widened the area in which mobile industry searched for potential locations and increased the competition faced by the city for new industry. Nonetheless Glasgow in particular provided labour supply advantages to incoming firms, which meant that it should still have proved attractive to new industry. The fact that this was not the case in the 1960s suggests that certain cost penalties operated to offset these advantages. The shortage of sites and factories seems to be a major element in the explanation, but Glasgow's unattractive image has also deterred a number of large engineering plants, in particular, from moving to the city.

CHAPTER 11

THE ATTRACTION OF THE NEW TOWNS TO INCOMING INDUSTRY

11.1 INTRODUCTION

The most publicised individual locations selected by incoming industry have probably been the five Scottish new towns set up originally under the 1946 New Towns Act. This Act allows the Secretary of State for Scotland to designate an area of land for development as a new town and appoint a Corporation to undertake the planning and development of the town. The Corporation has special powers for the compulsory purchase of land, infrastructure provision, obtaining planning consents direct from the Secretary of State and the provision of finance from central funds (Scottish Economic Planning Department, 1974). All these powers are relevant to the task of attracting mobile industry.

Following the 1946 Act the new towns of East Kilbride (1947) and Glenrothes (1948) were designated, but with different objectives. East Kilbride was to assist in the decentralisation of population and industry from Glasgow and from the congested areas of north west Lanarkshire. Glenrothes' main function was to act as a focal point for regrouping the mining industry in Fife and it was planned around a modern, new NCB pit.

In the 1950s only one additional new town was designated when Cumbernauld (1953) was given the task of facilitating the Glasgow

overspill programme, but a further two new towns were started in the 1960s. Livingston (1962) was to be the centre of a growth area designed to create a new focus of economic activity in central Scotland, in addition to assisting Glasgow overspill. Irvine (1966) was intended to promote economic development in an area which had shown itself attractive to industry. The objectives underlying the new town programme have evolved from a prime concern with physical planning problems, such as population overspill and redevelopment, to those of stimulating regional economic development.

11.2 THE IMPORTANCE OF THE NEW TOWNS IN ATTRACTING IMMIGRANT INDUSTRY

The growth of the new towns has been heavily dependent upon their ability to attract mobile industry in order to employ the population to be rehoused. There is little doubt that they have been relatively successful in attracting industry new to Scotland, because between 1952 and 1970 they obtained 20,300 jobs. This represents 22% of all those moving into Scotland (Table 11.1). Figures showing the employment in firms moving to individual new towns will be biased towards the longer established ones and so it is not unexpected to find that East Kilbride and Glenrothes were the most successful, attracting 5,680 and 4,650 jobs respectively between 1960 and 1970. These totals were exceeded only by the Bathgate Employment Exchange area as a result of the arrival of the British Motor Corporation.

The new towns' immigrant industry was dominated by the mechanical and electrical engineering and clothing sectors (Table 11.2). But as these were also dominant elsewhere in Scotland this might have been expected. When account is taken of the structure of incoming industry as a whole, the only industry that is significantly over-represented (.05 level) in the new towns is electrical engineering. This is particularly true in employment terms, since this industry provided about half of all immigrant jobs in the new towns compared with just over one-quarter in Scotland as a

TABLE 11.1 IMMIGRANT INDUSTRY ATTRACTED TO THE NEW TOWNS, 1952-1970

Period	Area	No of Estabs	% of Estabs	Employ (max)	% of Employ (max)	Average Mean Size
1952-59	New Towns	6	7.9	5,280	17.7	398
	Rest of Scotland	69	92.1	24,580	82.3	356
	All Scotland	75	100.0	29,860	100.0	393
1960-65	New Towns	27	20.0	10,510	26.4	390
	Rest of Scotland	108	80.0	29,260	73.6	271
	All Scotland	135	100.0	39,770	100.0	295
1966-70	New Towns	28	16.5	4,510	18.5	161
	Rest of Scotland	142	83.5	19,860	81.5	140
	All Scotland	170	100.0	24,370	100.0	143
1952-70	New Towns	61	16.1	20,300	21.6	333
	Rest of Scotland	319	83.9	73,690	78.4	231
	All Scotland	380	100.0	93,990	100.0	247

TABLE 11.2 INDUSTRIAL STRUCTURE OF IMMIGRANT INDUSTRY IN THE NEW TOWNS, 1960-1970

(SIC) Industry	New Towns				All Immigrants	
	No of Estabs	% of Estabs	Employ (max)	% of Employ (max)	% of Estabs	% of Employ (max)
3 Food, drink & tobacco	-	-	-	-	5.6	4.4
4/5 Chemicals	2	3.6	30	0.2	4.9	2.4
6 Metal manufacture	2	3.6	1,200	8.0	2.3	2.1
7 Mech Eng	9	16.4	950	6.3	13.4	8.1
8 Instr Eng	1	1.8	1,250	8.4	3.0	5.4
9 Elec Eng	13*	23.7	7,600	50.6	14.7	26.8
11 Vehicles	4	7.2	480	3.2	3.9	14.0
12 Metal goods n e s	3	5.5	370	2.4	8.5	4.4
13 Textiles	-	-	-	-	4.6	3.5
14/15 Leather & clothing	8	14.5	1,680	11.2	20.6	18.6
16 Bricks etc	4	7.3	300	2.0	5.9	2.7
17 Timber & furniture	-	-	-	-	3.0	1.1
18 Paper, printing etc	5	9.1	670	4.5	3.0	2.7
19 Other manufacture	4	7.3	490	3.2	6.6	3.8

* Significantly over-represented relative to immigrant industry as a whole (.05 level for Chi Square test).

whole. In fact the new towns obtained only 11.5% of the clothing plants, compared with 20% of those in other industries, but the difference is not statistically significant. The number of establishments in other industries was too small to identify with any confidence those that were particularly over or under-represented in the new towns.

11.3 EXPLAINING THE NEW TOWNS' ATTRACTION TO IMMIGRANT INDUSTRY

The previous chapters have examined a number of hypotheses that seek to explain the changing spatial distribution of new incoming industry and the new towns have been referred to in a number of contexts. The purpose of this section is to consider the new towns in the light of these findings.

11.3.1 Transport Costs and Accessibility Factors

Transport costs, or more particularly communication cost advantages, appear to be relevant to the location decisions of a number of industries. Nonetheless there are few grounds for concluding that the new towns enjoyed any particular competitive advantage over the rest of central Scotland, although East Kilbride, Cumbernauld and Livingston are all very well located in relation to transport arteries and urbanisation economies.

East Kilbride is close to the labour, services, inputs and markets of Clydeside. Cumbernauld is slightly further from Glasgow, but located on the Stirling road and is centrally located for the Scottish ports and market. Livingston's prime asset, stressed by the Lothian Regional Survey and Plan (1966) is its convenience for communications, located as it is astride the Glasgow-Edinburgh trunk road and accessible to both east and west coast ports and airports. All these locations are more central than those of Glenrothes and Irvine. Glenrothes is furthest from major ports, airports and road links to the south, but the fact that it

attracted more incoming industry than most other towns suggests that transport cost considerations were not a major constraint on location choice in the 1960s within central Scotland.

11.3.2 Government Policy

It has been argued that government policy influences the wider area within which immigrant industry examines potential locations. The new towns have, in general, been favourably placed in this respect; with the exception of Glenrothes up until 1962, all have been in the Assisted Area since their designation. Glenrothes Development Corporation (1961) were convinced that they were handicapped in their efforts to attract new industry by their exclusion from the Assisted Area. They argued that if "Glenrothes was placed in a position of being able to offer the same terms as are available in the other new towns and local authorities in Development Districts, the Corporation are confident that their progress in attracting industry would be much better than it has been to date".

The changing policy emphasis towards stimulating regional growth benefitted the new towns, which were all centres of the Growth Areas identified in the 1963 White Paper (Cmnd 2188). These were areas within central Scotland which were judged to be capable of substantial and rapid growth. They were intended to provide focal points of especially vigorous economic development. The Growth Areas had two main advantages. They were to receive priority for infrastructure development and also, unlike other Development Districts, they were not to be descheduled if unemployment fell below the critical 4.5% rate. This priority ended in 1966 when Development Area status was extended to the whole country except for Edinburgh, and from 1967 the small Special Development Areas were able to offer higher financial incentives than the new towns. Although they benefitted from regional planning policies this seems to be an insufficient explanation for their attraction to incoming firms. After all, other less successful

areas were also eligible for government financial assistance throughout this period and the Growth Area policy existed officially for only about three years.

11.3.3 The Availability of Labour

Empirical studies have identified the ready availability of labour as a major influence on the location decision and, in this respect, the new towns enjoy a number of advantages. The commitment to population growth means that an employer is guaranteed a steadily increasing labour supply, while in the shorter term the availability of overspill and key worker housing allows a firm either to bring or to attract skilled labour to the town.

The individual new towns vary in their labour reserves according to their size and that of neighbouring centres within the same labour market. In this respect East Kilbride is probably the most favourably placed since it can draw labour from the surrounding towns in Lanarkshire as well as from the south side of Glasgow. Only Glasgow itself, and some of its neighbouring towns, either equalled or exceeded East Kilbride's labour market potential. Such labour supply advantages were recognised in the 1966 White Paper on the Scottish Economy which concluded that "much of the success of the Scottish new towns ..... derives from their lying within the complex labour market and within range of the elaborate service facilities of a metropolitan or heavily urbanised area" (Cmnd, 2864).

11.3.4 The Availability of Serviced Sites and Factories

The immediate availability of serviced sites and factories are powerful inducements to immigrant industry and the new towns were extremely competitive in both respects. They made a major contribution to advance factory building, constructing 2.8 million sq ft of new floorspace, and were responsible for 60% of the new

factory space in the West Central and 54% of advance space in the East Central regions between 1960 and 1970. All the new towns attach considerable importance to their ability to provide factories. Livingston Development Corporation (1971) have stated, for example, that in their experience the immediate or early availability of factories built in advance of known requirements has been of vital importance to industrial development.

Their advance factory programmes usually allowed them to offer a range of buildings to any incoming firm that needed one and, unlike SIEC, the new towns were prepared to allocate factories for rehousing and non-manufacturing projects. The new towns built the highest proportion of small factories, with over three-quarters being smaller than 10,000 sq ft compared with only 5% of the SIEC factories. Such units were too small for most incoming firms, which explains why only 29% of new town advance factory space was initially occupied by immigrant plants, whereas in the case of the SIEC floorspace the figure was 68%. It also accounts for the relatively high proportion of new town immigrants which subsequently moved out of the advance factories, although this was also facilitated by the availability of serviced sites on which firms could build their own factories.

Although it is difficult to separate the individual influence of sites and factories on the decision to move to a particular location, it does appear that the availability of factory space was particularly important in the new towns. This conclusion arises from the finding that 62% of immigrant firms started production in an advance factory, compared with 49% on other industrial estates.

The quality, cost and availability of sites and factory space probably explain the particular attraction of the new towns for the engineering industry in general and the instrument/electrical engineering sector in particular. It was shown previously that this industry is strongly influenced in its choice of location by the availability of a new advance factory.

11.3.5 Development Corporation Assistance

The new town Development Corporations have all pursued active industrial development policies and specialist attention is given to the needs of immigrant industry since this provides the basis for much of their growth (Lothians Regional Survey and Plan, 1966). In support of this objective they have undertaken co-ordinated programmes of infrastructure development and industrial promotion. The provision of serviced sites and advance factories is probably the most effective way in which they are able to influence economic activity. Their attraction is further enhanced by the ability of the Development Corporations to offer mortgage facilities and concessional rents. In addition the availability of key worker housing, flexible planning and rapid decision making are all policies conducive to attracting incoming industry.

The ILAG survey (1973) referred to the energetic efforts of the Scottish new towns when it mentioned that fifteen of the thirty-two firms influenced by new town Corporations were Scottish cases. Univac Limited have specifically mentioned that they received considerable assistance from Livingston Development Corporation, who were prepared and able to provide direct and immediate answers to enquiries and where decision making is delegated to a few key individuals whom the firm came to know (TISC, 1973). The organisational framework of industrial promotion agencies therefore seems to be relevant to their effectiveness because Univac Limited found that in some authorities they had to contact various groups of people and this sometimes resulted in contradictory advice. The decisiveness of the Development Corporation and the availability of an advance factory were the main reasons for Univac Limited deciding to move to Livingston.

11.3.6 The Image of the New Towns

The new towns enjoy a general level of amenities and environment that compare favourably with most other urban areas in Scotland. They have benefitted from the concentration of public investment

and a co-ordinated development plan, which has been unhampered by existing land uses. The physical infrastructure is modern and there are no areas of urban decay which afflict many older towns. East Kilbride Development Corporation (1965) clearly felt that this gave them a useful advantage in attracting incoming industry. In their experience, "it is clear that staff coming from England prefer to live in surroundings which most nearly approximate to those to which they are accustomed. Conversely, if the management staff are not satisfied with their houses there is uncertainty in their factory life; hence even more effort is being put into the provision of a higher standard of managerial and semi-managerial housing".

The new towns also benefit from the favourable image of their economic as well as their physical environment. They have been largely free of the industrial relations problems of some of the older areas and give an impression of dynamism and growth: "the attractions for industry continue to grow with the growth of the town. Success breeds success" (East Kilbride Development Corporation, 1964).

Such considerations influence mobile industry and Cameron and Clark (1966) have shown that "the expected beneficial effects of an attractive environment upon labour productivity caused most firms to site in the newly developed centres or on the periphery of major urban areas". The new towns attracted the larger plants, for in every period the average size of their immigrant establishments exceeded the Scottish average (Table 11.1). This can probably be partly attributed to labour supply advantages such as growing population and key worker housing, but they also exerted a special appeal to the larger engineering units. Evidence was presented in the chapter on psychic costs to show that, even when allowance is made for industrial structure and for site and factory availability on industrial estates, such plants were over-represented in the new towns. It was argued that the new towns projected a favourable image to management and that this proved decisive in attracting such plants.

11.4 PLACING THE NEW TOWNS IN PERSPECTIVE

Despite their success in attracting about 23% of all immigrant employment between 1960 and 1970, there is a need to keep the contribution of the new towns in perspective. It is worth emphasising that the vast majority of incoming establishments (over 80%) selected a location outwith the new towns.

The new towns also seem to have suffered some erosion in their competitive edge during the course of the 1960s in that their share of both incoming establishments and employment declined after 1965. (Table 11.1). This is the reverse of what might have been expected. The early 1960s saw the arrival of two very large motor vehicle plants, neither of which moved to a new town, and this could have been thought likely to deflate the new towns' share of employment relative to the succeeding period. In addition, the latter 1960s saw a larger number of new towns in operation since Livingston's development effectively started only in the mid-1960s and Irvine was designated a new town in 1967.

It is also worth noting that each new town attracted fewer jobs after 1960 than its surrounding county (Table 11.3). East Kilbride's 5,680 jobs, for example, compared with 7,940 in the rest of Lanarkshire, while Fife obtained over half as many jobs again as Glenrothes. The lowest ratio of new town : county jobs occurred in Livingston, but this can be attributed to the movement of the British Motor Corporation into West Lothian. It is therefore misleading to place excessive emphasis on the new towns while ignoring the success of other areas.

A measure of the new towns' declining fortunes can be seen in East Kilbride and Cumbernauld, which after 1965 together attracted fewer new immigrant jobs than Glasgow (902 compared with 1,880). The new towns' share of the West of Scotland's incoming employment slumped from 31% in the early 1960s down to 10% after 1965. This contrasts noticeably with the East of Scotland, where the new towns' share of employment rose from 25% to 41% as a result of an inflow in both periods of about 3,500 jobs, whereas the rest of the region experienced a decline (Table 11.4).

TABLE 11.3 IMMIGRANT INDUSTRY IN THE NEW TOWNS AND THEIR SURROUNDING COUNTIES 1960-1970

Area*	Employment (Maximum) 1960-70		
	New Town	Rest of County	Ratio of New Town : Rest
East Kilbride	5,680	7,940	1 : 1.40
Cumbernauld	2,130	3,030	1 : 1.42
Glenrothes	4,650	7,310	1 : 1.57
Livingston	2,530	8,590	1 : 3.40

* Irvine has been excluded because it was not designated until 1967 and only attracted one immigrant subsequent to this.

TABLE 11.4 IMMIGRANT INDUSTRY IN THE NEW TOWNS AND THEIR REGIONS 1960-1970

Period	Region	Employment (Maximum)		
		New Towns	Region	New Towns as % of Region
1960-65	West Central	6,910	22,300	31.0
	East Central	3,590	14,680	24.5
1966-70	West Central	900	9,180	9.8
	East Central	3,580	8,650	41.4

The probable explanation for the new towns' decreasing share of immigrant industry employment is that their competitive position weakened as a result of the extensive development of new industrial estates and advance factories in other areas. Their share of both fell after 1965; from 45% to 35% in the case of the new industrial estate acreage and from 64% to 45% of the new advance factory space. This further strengthens the view that the availability of sites and factories represent the new towns' largest assets.

PART III

STATISTICAL ANALYSIS AND RESULTS

CHAPTER 12

THE STATISTICAL ANALYSIS

12.1 REASONS FOR UNDERTAKING A STATISTICAL ANALYSIS

The previous chapters discussed the individual variables hypothesised as exerting an influence on the choice of location in Scotland made by incoming industry. Each one was considered separately and assessed for its changing impact over time. On the basis of this type of approach it is rarely possible to determine the importance of one factor relative to another. Instead, what is required is a joint assessment of all the relevant considerations because if two factors are operating in opposite directions, either to attract or to repel incoming industry, each will disguise the other's impact. It is possible to standardise for such an effect by statistical means using multiple regression analysis.

This technique identifies the linear relationship, expressed in the multiple correlation coefficient (R), between a set of independent or explanatory variables, in this case a number of potential location factors, and a dependent variable, such as the volume of immigrant industry moving into an area. This is achieved by taking into account the inter-relationships among the independent variables (Nie et al, 1975; Koutsoyiannis, 1973). The difference between the actual value of the dependent variable and that "predicted" by the linear combination of the independent variables is the residual. The regression equations seek to "explain" by means of the R^2 (Coefficient of Determination) value

the proportion of variance in the dependent variable accounted for by the explanatory variables. The higher the R^2 value the better the explanatory power of the model.

The individual effect of each location factor on the volume of incoming industry can be identified by means of the sign and size of the regression coefficient. This shows the direction and strength of any relationship. A positive coefficient such as occurs in the case of unemployment indicates that the larger the supply of labour in an area, the larger the volume of mobile industry that will be attracted. The major location factors are identified on the basis of their significance levels.

The use of multiple regression analysis is well established in economic and geographical research and has been extensively used to identify the causal factors underlying a wide range of spatial distributions. These include retail prices (Chisholm and Campbell, 1970), land values (Yeates, 1965) and rural farm population densities (Robinson et al, 1961). In addition the technique has formed the basis of a number of studies of industrial location. These have dealt with urban decentralisation (Cameron, Firn et al, 1974), manufacturing employment growth (Smith, 1969; Keeble and Hauser, 1972) and inter-regional movement (Keeble, 1972 and Sant, 1975). By using multiple regression analysis the main factors attracting industry to particular areas or regions have been identified, although none of these studies has examined the locations chosen within the destination region by long distance industrial migrants.

Multiple regression analysis is used here to try and identify those factors which have either attracted industry to or repelled it from different parts of Scotland. Movement into each area is measured by the number of jobs provided by immigrant industry arriving in a specific time period. This is correlated with a range of explanatory variables hypothesised as being important influences on the location decision. More specifically, the relationship is expressed in the form:-

$$Y = a + b_1X_1 + b_2X_2 \ldots\ldots + b_nX_n + e$$

where Y = the number of jobs in an area
$X_1 \ldots X_n$ = the explanatory variables
e = error term or residual
a = a constant
b = the regression coefficients

The regression equations shown in Equations 13.1 to 13.38 include only those variables which display the predicted sign, since these are the only ones considered to be meaningful. Those regression coefficients which are not significant at the 95% confidence level are then excluded and the equations re-run using only the significant variables. The relative importance of each factor is identified by means of its standardised regression coefficient or beta weight value. This converts the different scales of each variable into comparable units on the basis of their standard deviations.

A major cause of variables displaying a sign which is the reverse of that predicted is multi-collinearity. Multiple regression analysis assumes that the independent variables are independent of each other. If this is not the case and they are inter-correlated then the sampling error of the regression coefficient will be large, resulting in its incorrect specification (Hauser, 1974). In extreme cases it may result in the occurrence of an incorrect sign, suggesting a false and misleading relationship.

Hauser (1974) suggests that if the correlation between independent variables exceeds $\pm$ 0.8 then collinearity is a serious problem. In such circumstances it probably is best to apply "zero restriction" and drop one of the variables from the equation (Keeble and Hauser, 1972), using the remaining variable as a surrogate for both. In the succeeding analysis this is in fact done if it makes theoretical sense. For example, the very high correlation between the advance factory and industrial estate variables in the 1945-51 period results in the former showing an incorrect sign and being omitted. The industrial estate variable is then assumed to represent new as well as existing factory space and site availability.

12.2 MEASURING THE VARIABLES

This section discusses the methods used to measure the variables used in the statistical analysis. The zones are those shown in Table 2.1 and represent the cities and counties or groups of counties. The analysis has been conducted on the basis of the four time periods discussed in Chapter 2.

Two ways of measuring the volume of immigrant industry have been used. Firstly, the maximum employment (regardless of year) provided by the establishments coming in each period; secondly, the employment they provided at the end of the period. This is undertaken both for immigrant industry as a whole and for the engineering sector on its own.

Maximum employment has been used both to ensure that all establishments were included, even those closing before the end of the period, and to allow for the build up in employment by firms coming only at the end of the period. On the other hand this build up to peak employment can occur many years later when it may be unrelated to conditions pertaining in the period during which the firm started production. The use of a measure of employment at the end of the period avoids this difficulty but excludes those plants closing before the terminal year.

The results using both measures are compared to see whether or not they produce similar findings. If not, an attempt is made to try and resolve the differences and to indicate which regression equation is likely to be the most meaningful.

12.2.1 The Dependent Variables

Y_1 = Maximum employment in all immigrant industry
Y_2 = Employment at the end of the period in all immigrant industry
Y_3 = Maximum employment in engineering immigrant plants
Y_4 = Employment at the end of the period in engineering immigrant plants

12.2.2 The Independent Variables

(a) Labour Supply

X_1 = the number of females unemployed - this is used to measure the female labour supply which became more important than male labour during the 1960s.

X_2 = the total number of people unemployed - this is used to measure the total labour supply.

X_3 = the female unemployment rate.

X_4 = the total unemployment rate.

The variables were measured in 1948, 1954, 1963 and 1966.

(b) Accessibility

X_5 = the distance from the Scottish market plus the UK market - the mean centre of the Scottish market is approximately at Stirling, while London was taken to represent the UK market.

(c) The Image of an Area

X_6 = the percentage of households living in overcrowded conditions (defined as more than two persons per room in 1951 and more than one and a half persons per room in 1961 and 1966) - this is used as a surrogate for an area's physical image.

X_7 = the percentage of economically active males in socio-economic groups 1 - 4 (basically managerial and professional groups) - this is used as a surrogate for an area's social image.

(d) Site and Factory Availability

X_8 = the acreage of new (less than 10 years developed) industrial estate land per 1,000 unemployed - this variable is a surrogate for the availability of industrial sites.

X_9 = the square footage of advance factory space built in the period per 1,000 unemployed - this variable is a surrogate for new factory availability.

Both variables are expressed as a ratio with the numbers unemployed to try and reduce collinearity because new sites and factories tended to be concentrated in areas of high unemployment. In addition, both act as a proxy either for central government policy (eg between 1945 and 1951) or for both central and local government policy (eg the 1960s).

(e) Local Authority Assistance

X_{10} = the proportion of local authorities in each area who developed industrial estates or advance factories.

The only variables where the regression coefficients are expected to have a negative sign are X_5 and X_6. In all other cases a positive relationship is hypothesised.

CHAPTER 13

THE RESULTS OF THE MULTIPLE REGRESSION ANALYSIS

This Chapter discusses the results of the multiple regression analysis for each of the periods analysed.

13.1 THE 1945-51 PERIOD

The circumstances of this period were exceptional in that wartime building controls still existed, along with the newly introduced Industrial Development Certificates. There was a pronounced shortage of premises as a result of both war damage and the release of pent-up consumer demand as the economy moved away from its war footing. This situation allowed the Government to exercise a strong influence on the location decisions by means of its control over industrial building activity.

The results from the regression equations are consistent with these circumstances. Equations 13.1 to 13.4 show that only four factors appear to be relevant to the choice of location. The availability of labour, measured either as the actual number or percentage of people unemployed, and the ability to offer sites and factories proved positive inducements, whereas distance from markets or inputs was negatively related to the amount of industry moving to an area. The high correlation (+0.92) between the advance

factory and industrial estate variables means that the latter is used to act as a surrogate for new as well as second hand premises and serviced sites (Table 13.1).

In the case of both immigrant industry as a whole and the engineering sector on its own these variables provide a higher R^2 value when employment is measured at the end of the period rather than at its maximum. This is not unexpected given that the build up to peak employment sometimes did not occur until the 1960s when very different conditions prevailed. Consequently the results are discussed in terms of employment at the end of the period.

Factory space and labour availability (measured in terms of total unemployment) stand out as the important considerations both for incoming industry as a whole and for the engineering sector on its own. The beta weight values indicate that of these factors the availability of factory space was about 50% more important to all immigrants than labour availability, whereas it was more than twice as important for the engineering sector (Equations 13.6 and 13.8; Table 13.2).

The results are therefore consistent with the view that factory space was at a premium in this period. Since all the advance factories were government built, all new purpose built premises were subject to strict government control and many of the re-lets were government munition factories, it is clear that government policy had a pronounced effect on the choice of location within Scotland. It is also consistent with the argument that the availability of factory space is particularly attractive to engineering firms.

The strong preference of immigrant industry for a location either on Clydeside or in Dundee can therefore be attributed largely to the concentration of government factory building in these areas, although their large labour supplies were also a significant additional attraction.

TABLE 13.1 CORRELATIONS BETWEEN THE VARIABLES: 1945-1951

	Y_1	Y_2	Y_3	Y_4	X_2	X_4	X_5	X_6	X_7	X_8	X_9
Y_1	1.00										
Y_2	0.96	1.00									
Y_3	0.97	0.90	1.00								
Y_4	0.94	0.96	0.94	1.00							
X_2	0.58	0.74	0.47	0.70	1.00						
X_4	0.62	0.63	0.55	0.55	0.48	1.00					
X_5	-0.23	-0.28	-0.20	-0.26	-0.26	0.24	1.00				
X_6	0.68	0.73	0.60	0.76	0.80	0.45	-0.41	1.00			
X_7	-0.07	-0.09	-0.06	-0.09	0.04	-0.13	-0.03	-0.18	1.00		
X_8	0.86	0.86	0.87	0.90	0.52	0.48	0.26	0.62	0.02	1.00	
X_9	0.76	0.80	0.72	0.79	0.46	0.46	-0.30	0.61	0.05	0.92	1.00

Notes

(a) All values are positive unless otherwise shown.

(b) For the key to the variables see text (12.1 and 12.2).

REGRESSION EQUATIONS - ALL VARIABLES WITH THE PREDICTED SIGN

(13.1) $Y_1 = 1105.34 + 0.08X_2 + 1124.26X_4^{*} - 5.05X_5 + 2716.24X_8^{**}$
(0.16) (526.66) (5.23) (567.29)

$R = 0.90$ $R^2 = +0.81$

(13.2) $Y_2 = 460.72 + 0.15X_2^{**} + 359.83X_4^{*} - 1.99X_5 + 908.45X_8^{**}$
(0.05) (160.33) (1.59) (172.70)

$R = 0.94$ $R^2 = +0.89$

(13.3) $Y_3 = 6.63 + 502.08X_4 - 1.3.X_5 + 2297.84X_8^{**}$
(359.76) (3.71) (414.26)

$R = +0.88$ $R^2 = +0.78$

(13.4) $Y_4 = -8.48 + 0.07X_2^{*} + 59.17X_4 - 0.17X_5 + 620.94X_8^{**}$
(0.03) (82.63) (0.82) (89.00)

$R = +0.94$ $R^2 = 0.89$

NOTES: (a) Figures in brackets are the standard errors of the regression coefficients.

(b) * - significant at the 95% level
**- significant at tne 99% level

REGRESSION EQUATIONS - ALL SIGNIFICANT VARIABLES

(13.5) $Y_1 = -1289.35 + 986.12X_4^{*} + 3070.40X_8^{**}$
(429.86) (491.9.)

$R = +0.89$ $R^2 = +0.79$

(13.6) $Y_2 = -41.66 + 0.19X_2^{**} + 1074.71X_8$
(0.05) (166.30)

$R = +0.92$ $R^2 = +0.86$

(13.7) $Y_3 = 166.95 + 2609.53X_8^{**}$
(325.93)

$R = +0.87$ $R^2 = +0.75$

(13.8) $Y_4 = -6.80 + 0.08X_2^{**} + 645.64X_8^{**}$
(0.02) (76.86)

$R = +0.94$ $R^2 = +0.89$

NOTES: (a) Figures in brackets are the standard errors of the regression coefficients.

(b) * - significant at the 95% level
** - significant at the 99% level

TABLE 13.2 BETA WEIGHT VALUES - ALL SIGNIFICANT VARIABLES

Dependent Variable	X_2	X_4	X_8
Y_1	-	+0.27	+0.73
Y_2	+0.41	-	+0.64
Y_3	-	-	+0.87
Y_4	+0.31	-	+0.74

13.2 THE 1952-59 PERIOD

This period was one of relatively lax regional policy (Moore and Rhodes, 1973), with little attempt by government to influence the location decisions of immigrant industry. Only two new government industrial estates were started in this period and no advance factories were built. Nevertheless sites were available on the existing estates and premises became vacant for re-letting from time to time, so that government influence on location decisions was not entirely absent.

During the 1950s three of the new towns began to develop their own industrial estates and to attract new industry, although the only advance factories were a few nest units which tended to hold little appeal to immigrant firms. The removal of wartime building controls, the larger supply of factory space as a result of the post-war building boom, and the cessation of the demand pressures which were experienced just after the war meant that the demand for new factories had eased, while the supply of premises had improved. Consequently the influence of factory space (and government policy for which it acted as a proxy) on the choice of site is likely to be less in evidence during this period.

Once again four factors stand out as being relevant to the choice of location within Scotland (Equations 13.9 to 13.12). Distance from markets continued to deter industry from moving to the remoter areas whereas a good supply of labour and of sites/factory space proved a positive inducement.

The R^2 values remain highest when employment is measured at the end of the period, although the difference is much less pronounced than in the previous period. The results are therefore discussed in terms of this measure of immigrant industry. The variables "explain" about 88% of the variation in employment in all immigrant plants and 86% in the engineering sector.

Labour availability and the supply of sites/factories again stand out as being of prime concern to incoming establishments, although this time their ranks are reversed in the case of all immigrants. The beta weight values suggest that labour supply exerts nearly

twice as much influence as the availability of sites/premises. This is consistent with the view that since supply and demand for factory space was more in balance during this period its effect on the choice of site would be correspondingly less. It also reflects the reduced government control over factory building. The decline in "explanatory" power when only these two variables are used in the equation is minimal since R^2 falls from 0.88 to 0.86 and suggests that these factors were of overwhelming importance.

Engineering immigrants differ in that the R^2 value is the same whether employment is taken at its maximum or at the end of the period. However the significant factors are influenced by the employment measure used. When the dependent variable is employment at its maximum the critical location factors are the availability of both sites and factories and of labour (as reflected in the rate of unemployment) and distance to markets. Of these, sites and factory space exert about four times the weight of the other factors. The reason why neither distance nor the rate of unemployment shows up as significant in the full equation is that their impact is reduced by the presence of the variable measuring total unemployment.

When engineering employment is assessed at the end of the period the availability of sites and factories continues to be the outstanding factor but its relative importance is reduced to about 50% above that of the total supply of labour. Neither the rate of unemployment nor distance to market is significant in this equation.

Therefore both measures of engineering employment agree that site and factory availability continues to be of outstanding importance to engineering immigrants, with labour supply of lesser significance. This contrasts with immigrant industry in general and reflects the greater importance of site/factory space to engineering plants.

TABLE 13.3 CORRELATIONS BETWEEN THE VARIABLES: 1952-59

	Y_1	Y_2	Y_3	Y_4	X_2	X_4	X_5	X_6	X_7	X_8	X_9
Y_1	1.00										
Y_2	0.98	1.00									
Y_3	0.89	0.80	1.00								
Y_4	0.97	0.94	0.94	1.00							
X_2	0.78	0.87	0.48	0.72	1.00						
X_4	0.30	0.31	0.28	0.32	0.28	1.00					
X_5	-0.34	-0.32	-0.27	-0.28	-0.27	0.44	1.00				
X_6	0.76	0.79	0.56	0.69	0.81	0.25	-0.41	1.00			
X_7	-0.10	-0.12	-0.02	-0.08	0.02	-0.13	-0.03	-0.18	1.00		
X_8	0.77	0.67	0.90	0.82	0.42	0.19	-0.19	0.52	0.16	1.00	
X_9	-	-	-	-	-	-	-	-	-	-	-

NOTES: (a) All variables are positive unless otherwise shown.

(b) For the key to the variables see text (12.1 and 12.2)

REGRESSION EQUATIONS - ALL VARIABLES WITH THE PREDICTED SIGN

(13. 9) $Y_1 = 927.09 + 0.34X_2^{**} + 344.09X_4 - 3.38X_5 + 596.67X_8^{**}$
(0.08) (241.23) (2.02) (116.42)

$R = +0.93$ $R^2 = +0.86$

(13.10) $Y_2 = 219.87 + 0.25X_2^{**} + 148.89X_4 - 1.32X_5 + 218.19X_8^{**}$
(0.04) (121.50) (1.02) (58.64)

$R = +0.94$ $R^2 = +0.88$

(13.11) $Y_3 = 545.32 + 0.01X_2 + 284.85X_4 - 2.37X_5 + 589.40X_8^{**}$
(0.05) (149.87) (1.26) (72.33)

$R = +0.93$ $R^2 = +0.86$

(13.12) $Y_4 = 10.25 + 0.08X_2^{**} + 93.50X_4 - 0.65X_5 + 202.51X_8^{**}$
(0.02) (68.39) (0.57) (33.01)

$R = +0.93$ $R^2 = +0.86$

NOTES: (a) Figures in brackets are the standard errors of the regression coefficients.

(b) * - significant at the 95% level
** - significant at the 99% level

REGRESSION EQUATIONS - ALL SIGNIFICANT VARIABLES

(13.13) $Y_1 = -264.03 + 0.40X_2^{**} + 631.01X_8^{**}$
(0.07) (117.95)

$R = +0.92$ $R^2 = +0.84$

(13.14) $Y_2 = -220.51 + 0.28X_2^{**} + 232.26X_8^{**}$
(0.04) (57.86)

$R = +0.93$ $R^2 = +0.86$

(13.15) $Y_3 = 581.53 + 295.45X_4^{*} - 2.46X_5^{*} + 593.31X_8^{**}$
(134.30) (1.13) (67.21)

$R = +0.93$ $R^2 = +0.86$

(13.16) $Y_4 = -168.50 + 0.09X_2^{**} + 210.32X_8^{**}$
(0.02) (32.59)

$R = +0.92$ $R^2 = +0.94$

NOTES: (a) Figures in brackets are the standard errors of the regression coefficients

(b) * - significant at the 95% level
** - significant at the 99% level

TABLE 13.4 BETA WEIGHT VALUES - ALL SIGNIFICANT VARIABLES

Dependent Variable	X_2	X_4	X_5	X_8
Y_1	+0.55	-	-	+0.53
Y_2	+0.71	-	-	+0.37
Y_3	-	+0.22	-0.22	+0.82
Y_4	+0.45	-	-	+0.63

13.3 THE 1960-65 PERIOD

During this period regional policy was greatly strengthened, resulting in an increase in the volume of inter-regional industrial movement (Moore and Rhodes, 1973). Financial incentives were introduced, IDC policy was tightened and advance factory building was re-started by central government as well as being greatly expanded by the new towns and started for the first time by local authorities. In addition the areas eligible for government assistance were extended, thereby effectively widening the potential choice of locations for immigrant industry.

The structure of immigrant industry underwent pronounced changes in this period. Electrical engineering and clothing establishments provided a growing share of the incoming employment, whereas mechanical engineering plants provided fewer jobs. This resulted in demand shifting from male to female labour, although the arrival of two large motor vehicle plants disguises this trend. Consequently female labour became increasingly important as a location factor. The preference of both electrical engineering and clothing plants for available factory space, particularly in the form of new advance factories, suggests that the availability of premises is again likely to be a relevant consideration.

Differences in the results for immigrant industry in general and for the engineering industry on its own mean that the respective findings are considered separately. Six variables appear to be relevant to the location decisions of immigrant industry and together they "explain" at least 85% of the total variance (Equations 13.17 and 13.19). End of period employment continues to produce the highest R^2 values.

Two equations are shown for each dependent variable. The difference between them is that physical image is substituted for accessibility in the second equation. It was hypothesised previously that psychic income/cost factors would become increasingly relevant as the 1960s progressed and the results arguably provide some evidence for this trend.

Unfortunately the physical image and labour supply variables are very highly correlated (+0.36), so that it is not possible to identify satisfactorily the individual impact of image factors. The results for immigrant industry as a whole show however that the overall level of "explanation" (R^2) increases when the image variable is incorporated into the equations. This indicates that it makes a valuable contribution to the overall level of explanation. In addition this is the first period in which the image variable has the predicted sign. Problems of collinearity are so severe that they prevent a more precise identification of its relative importance from being established.

Nevertheless the equations (13.17 - 13.20) agree that female labour availability, as measured by both actual and percentage unemployment, the presence of sites and factories, and local authority activity were all relevant considerations for incoming industry. This is also the first time in which advance factory space can be separately identified from the overall provision of industrial estate sites and factories. The correlation of +0.55 between these variables compares to one of +0.92 between 1945 and 1951. As far as the significant variables are concerned there is general agreement that labour, site and/or factory availability are the major location factors (Equations 13.25 - 13.28).

There is some divergence amongst the different equations in terms of the outstanding location factor. Assuming that employment at the end of the period is a better indicator than maximum employment, in that it has a higher R^2 value, the availability of sites/factory space seems to be the most important location factor. It has the highest beta weight score whether or not the physical image variable is included in the equations (Table 13.6). However, there is a marked difference between the equations in the contribution of female labour to the overall level of explanation. Its full impact will be hidden if an area's physical image is not taken into account because the advantages of a large labour supply can be partly offset by a poor physical environment.

Consequently when the physical image variable is ignored, female labour supply, whether measured by the actual or percentage unemployment rate, only carries half the weight of site/factory

availability. However when allowance is made for the negative effect of a poor environment the actual size of the labour supply becomes much more significant. It then ranks above the relative availability of labour (ie the rate of unemployment) and much closer to considerations of factory availability (Table 13.6).

The fact that the percentage rate of female unemployment is a significant factor provides some support for the impact of government policy. Development Districts were designated largely on the basis of their unemployment rate and there is a high correlation (+0.86) between the female and total unemployment rates. The concentration of advance factory building in the Assisted Areas can be seen in the correlation of +0.61 between the advance factory and female unemployment rate variables.

When employment is measured at its maximum a different ranking of significant factors becomes apparent. Female labour supply either ranks equal to or higher than the availability of factory space, depending on whether or not the physical image variable is included in the equation (Table 13.6). A further change is that advance factory space shows up as a significant factor in its own right, rather than being subsumed by the industrial estate variable.

The conclusion arising from this discussion is that the size of the female labour supply and the availability of factory space (whether new or second hand) are the outstanding attractions to immigrant industry in this period. Their relative ranking depends on how the volume of incoming industry is measured. Physical image is also a relevant consideration, although collinearity problems prevent the real extent of its impact from being satisfactorily identified.

Interpretation of the regression equations becomes even more difficult in the case of engineering immigrants. Before the inclusion of the physical image variable the overall level of "explanation" is extremely low at 52% and none of the three factors included in the equation is significant (Equations 13.21 and 13.23). This is in direct contrast to the situation for all immigrant plants, where the stepwise multiple regression procedure identified four significant factors when physical environment was excluded from the analysis.

The effect of adding the physical image variable is a dramatic rise in the overall explanation from about 50% to 72% (Equations 13.22 and 13.24). No comparable increase occurred for immigrant firms as a whole. The other impact is to render the supply of both female labour and advance factory space significant. Such a pronounced effect is consistent with the view that an attractive environment is particularly important to the engineering industry.

The fact that the advance factory rather than the industrial estate variable is significant supports the argument advanced in Part II that the availability of new factory premises is particularly important to electrical engineering, which dominated the engineering sector at this time. However the correlation of +0.55 with the industrial estate variable suggests that it also acts as a partial surrogate for the previously occupied premises found on such estates.

The severe collinearity problems arising from the physical image variable make any sensible interpretation of the results extremely difficult. As far as the engineering sector is concerned, the best that can probably be done is to conclude that the availability of both female labour and factory space are particularly important, while an area's physical environment can also sway the location decision.

TABLE 13.5 CORRELATIONS BETWEEN THE VARIABLES: 1960-1965

	Y_1	Y_2	Y_3	Y_4	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
Y_1	1.00													
Y_2	0.95	1.00												
Y_3	0.80	0.68	1.00											
Y_4	0.78	0.68	0.99	1.00										
X_1	0.58	0.48	0.56	0.56	1.00									
X_2	0.33	0.28	0.33	0.34	0.94	1.00								
X_3	0.76	0.68	0.59	0.57	0.46	0.22	1.00							
X_4	0.63	0.53	0.47	0.45	0.61	0.47	0.87	1.00						
X_5	-0.39	-0.38	-0.22	-0.22	-0.38	-0.31	-0.20	-0.20	1.00					
X_6	0.46	0.44	0.29	0.28	0.86	0.89	0.32	0.53	-0.31	1.00				
X_7	-0.43	-0.47	-0.37	-0.37	-0.53	-0.45	-0.45	-0.33	0.16	-0.53	1.00			
X_8	0.57	0.77	0.22	-0.37	0.04	-0.01	0.32	0.15	-0.24	0.22	-0.37	1.00		
X_9	0.78	0.74	0.58	0.56	0.31	0.15	0.61	0.54	-0.32	0.34	-0.14	0.55	1.00	
X_{10}	0.18	0.27	0.04	0.06	-0.21	-0.27	0.09	-0.15	-0.10	-0.10	-0.05	0.42	0.23	1.00

NOTES: (a) All variables are positive unless otherwise shown.
(b) For the key to the variables see text (12.1 and 12.2).

REGRESSION EQUATIONS - ALL VARIABLES WITH THE PREDICTED SIGN

(13.17) $Y_1 = -1062.93 + 0.61X_1^{*} + 492.0X_3^{*} - 0.82X_5 + 34.43X_8 + 35.57X_9^{*} + 2.23X_{10}$
(0.25) (205.13) (2.38) (17.06) (15.49) (7.77)

$R = +0.92$ $R^2 = +0.85$

(13.18) $Y_1 = 1776.69 + 1.48X_1^{*} + 329.98X_3 - 363.93X_6^{*} + 48.15X_8^{**} + 40.23X_9^{**} + 2.56X_{10}$
(0.39) (184.45) (147.37) (15.44) (13.17) (6.60)

$R = +0.94$ $R^2 = +0.89$

(13.19) $Y_2 = -551.13 + 0.35X_1^{*} + 258.66X_3^{*} - 0.47X_5 + 48.55X_8^{**} + 9.93X_9 + 1.27X_{10}$
(0.13) (107.04) (1.25) (8.90) (8.09) (4.05)

$R = 0.95$ $R^2 = +0.89$

(13.20) $Y_2 = 914.01 + 0.80X_1^{**} + 173.43X_3 - 190.51X_6^{*} + 55.78X_8^{**} + 12.41X_9 + 1.45X_{10}$
(0.20) (96.22) (76.88) (8.05) (6.87) (3.44)

$R = 0.96$ $R^2 = +0.92$

(13.21) $Y_3 = -788.17 + 0.43X_1 + 195.22X_3 + 22.51X_9$
(0.21) (199.55) (13.10)

$R = +0.72$ $R^2 = 0.52$

(13.22) $Y_3 = 3278.39 + 1.47X_1^{**} + 3.27X_3 - 456.74X_6^{**} + 8.62X_8 + 30.20X_9^{*} + 1.73X_{10}$
(0.38) (179.96) (143.79) (15.06) (12.84) (6.44)

$R = +0.84$ $R^2 = +0.71$

(13.23) $Y_4 = 405.89 + 0.25X_1 + 99.73X_3 + 11.93X_9$
(0.12) (113.13) (7.43)

$R = +0.71$ $R^2 = +0.50$

(13.24) $Y_4 = 1956.09 + 0.88X_1^{**} - 272.53X_6^{**} + 7.74X_8 + 14.58X_9^{*} + 1.35X_{10}$
(0.18) (71.39) (7.88) (5.93) (3.39)

$R = +0.85$ $R^2 = +0.72$

NOTES: (a) Figures in brackets are the standard errors of the regression coefficients.
(b) * - significant at the 95% level
** - significant at the 99% level

REGRESSION EQUATIONS - ALL SIGNIFICANT VARIABLES

(13.25) $Y_1 = -1384.23 + 0.63X_1^{**} + 486.00X_3^{*} + 36.85X_8^{*} + 36.69X_9^{*}$
(0.21) (192.92) (15.21) (14.50)

$R = +0.92$ $R^2 = +0.85$

(13.26) $Y_1 = 3460.81 + 1.78X_1^{**} - 453.30X_6^{**} + 53.80X_8^{**} + 52.06X_9^{**}$
(0.36) (144.17) (15.10) (11.93)

$R = +0.93$ $R^2 = +0.87$

(13.27) $Y_2 = 873.72 + 0.37X_1^{**} + 322.31X_3^{**} + 55.37X_8^{**}$
(0.11) (90.77) (7.11)

$R = +0.94$ $R^2 = +0.88$

(13.28) $Y_2 = 680.39 + 0.77X_1^{**} + 260.91X_3^{**} - 173.76X_6^{*} + 62.58X_8^{**}$
(0.21) (87.55) (79.55) (7.28)

$R = +0.95$ $R^2 = +0.91$

(13.29) $Y_3 = 3170.22 + 1.38X_1^{**} - 426.09X_6^{**} + 34.93X_9^{**}$
(0.29) (119.04) (8.72)

$R = +0.84$ $R^2 = +0.70$

(13.30) $Y_4 = 1837.33 + 0.79X_1^{**} - 244.77X_6^{**} + 18.61X_9^{**}$
(0.16) (66.36) (4.86)

$R = +0.84$ $R^2 = +0.70$

NOTES: (a) Figures in brackets are the standard errors of the regression coefficients.

(b) * - significant at the 95% level
** - significant at the 99% level

TABLE 13.6 BETA WEIGHT VALUES - ALL SIGNIFICANT VARIABLES

Dependent Variable	X_1	X_3	X_6	X_8	X_9
Y_1	+0.32	+0.32	-	+0.27	+0.34
Y_1	+0.90	-	-0.57	+0.40	+0.48
Y_2	+0.30	+0.34	-	+0.66	-
Y_2	+0.62	+0.27	-0.35	+0.74	-
Y_3	+1.15	-	-0.88	-	+0.54
Y_4	+1.18	-	-0.91	-	+0.51

13.4 THE 1966-70 PERIOD

At the start of this period the whole of Scotland, with the exception of Edinburgh, became a Development Area and the following year a number of mining centres were designated as Special Development Areas (SDAs), with enhanced incentives. With the exception of Edinburgh and the SDAs, nowhere was particularly advantaged or disadvantaged in respect of the financial assistance available so that government policy effectively became spatially neutral. Consequently it can in general be ignored as a location factor.

Advance factory building by central and local government and new town development corporations more than doubled, to the benefit of a wider range of locations. The attraction of female labour supplies grew as electrical engineering and clothing plants began to dominate the structure of incoming industry. The rising unemployment, together with the additional new factory space, meant that more areas than previously were able to meet the labour and factory requirements of incoming industry. As a result spatial cost differences declined, thereby allowing non-economic factors to exert a greater influence on the choice of site within Scotland.

The correlations between the independent variables in Table 13.7 show that the areas most competitive in terms of advance factory space also tended to be those with the most land developed in the form of industrial estates ($r = +0.60$). The variables measuring an area's image are hypothesised as being particularly relevant in this period and it is fortunate that collinearity problems, although not absent, are much reduced in comparison with earlier periods. Those areas with the worst physical image in general had the highest levels of unemployment but the correlation of +0.65 compares with +0.86 in the early 1960s. The corollary is that it is more reasonable to assume that image can now be identified as a significant factor in its own right.

Once again the R^2 value is higher for all immigrant employment than for engineering employment on its own. However this is the only time during which maximum employment gives rise to a higher R^2 than employment at the end of the period (Equations 13.31 and

13.32). In some ways this is to be expected. In previous periods the maximum number of jobs from a project usually occurred in subsequent periods when conditions differed from those prevailing at the time the development was initially undertaken. In contrast in the late 1960s there is no later period identified during which such an employment build-up can occur. Since employment at the end of the period in 1970 excludes closures, unlike the maximum employment figure, it is perhaps not surprising that the latter seems to provide a clearer picture of the development occurring during the period itself.

The regression equation shows that four factors stand out as relevant to the location decisions of immigrant industry. These are the supply of female labour, physical image, the availability of serviced sites/previously occupied premises and new advance factories. Together they "explain" about 87% of the overall spatial variation in immigrant industry employment (Equation 13.31). This is the first period in which accessibility is not a relevant factor, possibly because the dominant industries such as electrical engineering and clothing were least constrained by the need for market access. The rate of unemployment is also unimportant, possibly reflecting the cessation of the link with Assisted Area status.

When the analysis is restricted to the significant variables there is only a marginal decline in the R^2 value (Equation 13.35). The beta weight figures indicate that the availability of female labour exerted the strongest influence on the location decision, carrying about 50% more weight than the availability of factory, particularly new, floorspace. This in turn has about one-third more impact than an area's physical image (Table 13.8). The rankings remain unchanged in the case of employment at the end of the period, although physical image exerts a relatively stronger influence.

The correlation between the industrial estate and advance factory variables suggests that the latter subsumes some of the influence of the former when the analysis is confined to the significant variables. It therefore appears that the advance factory variable, at least in part, acts as a surrogate for previously occupied floorspace. It seems safer to conclude that the availability of

premises as a whole was a significant factor, although new advance factories were particularly attractive. Since the industrial estates and advance factories were either developed by central or local government and their agencies, they also represent success for public policy initiatives.

Engineering immigrants seem to have been more conscious of an area's image than immigrant establishments as a whole, and displayed a stronger preference for places with an attractive physical environment. There are two pieces of evidence for this view. Firstly, this was the only period when social image, as reflected by the proportion of managerial and professional workers living in an area, was a relevant, albeit minor, factor. Secondly, an area's physical image ranked more highly amongst the significant variables than was the case with all immigrants. Its beta weight score exceeded that of factory space, although it was still below that for female labour (Table 13.8).

The statistical results therefore support the hypothesis advanced in Part II that non-economic location factors, such as psychic costs or income, only became significant during the course of the 1960s. Furthermore it was also hypothesised that they were likely to be of particular concern to engineering firms.

TABLE 13.7 CORRELATIONS BETWEEN THE VARIABLES: 1966-1970

	Y_1	Y_2	Y_3	Y_4	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
Y_1	1.00													
Y_2	0.99	1.00												
Y_3	0.91	0.92	1.00											
Y_4	0.91	0.91	0.99	1.00										
X_1	0.66	0.59	0.59	0.59	1.00									
X_2	0.39	0.30	0.24	0.23	0.89	1.00								
X_3	0.30	0.31	0.37	0.38	0.21	-0.05	1.00							
X_4	0.02	0.01	0.05	0.06	0.16	0.08	0.84	1.00						
X_5	-0.35	-0.33	-0.32	-0.32	-0.37	-0.30	0.19	0.40	1.00					
X_6	0.10	0.01	-0.02	-0.04	0.65	0.89	-0.20	0.06	-0.17	1.00				
X_7	-0.37	-0.36	-0.22	-0.23	-0.24	-0.19	-0.45	-0.32	0.06	-0.02	1.00			
X_8	0.41	0.42	0.26	0.26	-0.11	-0.18	0.30	0.09	0.07	-0.21	-0.39	1.00		
X_9	0.68	0.68	0.61	0.60	0.15	-0.03	0.25	-0.05	-0.41	-0.15	-0.22	0.60	1.00	
X_{10}	0.20	0.24	0.17	0.18	-0.22	-0.30	-0.10	-0.42	-0.12	-0.37	-0.04	0.50	0.47	1.00

NOTES: (a) All values are positive unless otherwise stated.

(b) For the key to the variables see text (12.1 and 12.2).

REGRESSION EQUATIONS - ALL VARIABLES WITH THE PREDICTED SIGN

(13.31) $Y_1 = 355.91 + 1.29X_1^{**} - 267.87X_6^{**} + 16.02X_8 + 7.82X_9^{**}$
(0.18) (84.42) (8.29) (2.40)

$R = +0.93$ $R^2 = +0.87$

(13.32) $Y_2 = 464.29 + 1.03X_1^{**} - 265.71X_6^{**} + 12.85X_8 + 6.18X_9^{*}$
(0.16) (77.54) (7.61) (2.21)

$R = +0.92$ $R^2 = +0.84$

(13.33) $Y_3 = 98.69 + 0.88X_1^{**} - 263.74X_6^{**} + 3.07X_8 + 5.52X_9^{**}$
(0.15) (69.64) (4.28) (1.57)

$R = +0.89$ $R^2 = +0.80$

(13.34) $Y_4 = 84.46 + 0.77X_1^{**} - 237.19X_6^{**} + 2.73X_7 + 2.73X_8 + 4.09X_9^{**}$
(0.14) (62.33) (4.20) (6.66) (1.77)

$R = +0.89$ $R^2 = +0.79$

NOTES: (a) Figures in brackets are the standard errors of the regression coefficients.

(b) * - significant at the 95% level
** - significant at the 99% level

REGRESSION EQUATIONS - ALL SIGNIFICANT VARIABLES

(13.35) $Y_1 = 477.76 + 1.21X_1^{**} - 261.21X_6^{**} + 10.67X_9^{**}$
(0.18) (90.22) (2.03)

$R = +0.92$ $R^2 = 0.85$

(13.36) $Y_2 = 562.04 + 0.97X_1^{**} - 260.36X_6^{**} + 8.46X_9^{**}$
(0.17) (81.16) (1.83)

$R = +0.90$ $R^2 = +0.81$

(13.37) $Y_3 = 468.08 + 0.85X_1^{**} - 257.35X_6^{**} + 5.36X_9^{**}$
(0.14) (68.18) (1.53)

$R = +0.89$ $R^2 = +0.79$

(13.38) $Y_4 = 433.35 + 0.74X_1^{**} - 230.38X_6^{**} + 4.43X_9^{**}$
(0.12) (58.92) (1.33)

$R = +0.89$ $R^2 = +0.79$

NOTES: (a) Figures in brackets are the standard errors of the regression coefficients.

(b) * - significant at the 95% level
** - significant at the 99% level

TABLE 13.8 BETA WEIGHT VALUES - ALL SIGNIFICANT VARIABLES

Dependent Variable	X_1	X_6	X_9
Y_1	+0.82	-0.36	+0.50
Y_2	+0.81	-0.45	+0.49
Y_3	+0.90	-0.56	+0.39
Y_4	+0.91	-0.58	+0.38

13.5 IMMIGRANT INDUSTRY - RESIDUALS

The residuals derived from the regression equations indicate those places which have attracted either more or less industry than expected on the basis of the variables identified as being relevant to the location decision. The equations used to produce the residuals were those with the highest R^2 value for all the variables with the predicted sign. Areas which regularly obtain more industry than predicted appear to enjoy additional advantages, whereas those with a persistent deficit can be assumed to be particularly disadvantages.

The residuals are plotted on Maps 13.1 to 13.4 for those areas with the largest values, as determined by both their actual and relative magnitudes. A completely arbitrary cut-off point was chosen to isolate the more extreme scores, which are of most interest. The criterion adopted was a residual in excess of both $\pm$ 200 jobs and $\pm$ 10% of the predicted value. In this way areas attracting few jobs but with a large percentage residual and those with a residual large in absolute, but small in relative, terms, were excluded.

In the West of Scotland, Lanarkshire stands out as a particularly attractive area in that it obtained more jobs than expected in every period, even though this was only just the case in the latter 1960s. Glasgow's fortunes fluctuated over time. The city attracted fewer jobs than expected on the basis of its available labour and factory space prior to 1951, but about the expected volume of employment during the 1950s. Consequently there is no consistent evidence at this time to show that a distinctive Glasgow factor was operating to deter incoming firms. There is however some evidence for this in the 1960s, when psychic cost/income factors became important. Prior to 1965 the city experienced an extremely large shortfall of immigrant employment, totalling 870/1130 jobs or a deficit equal to about 50% of the expected number of jobs. Failure to isolate satisfactorily the image factor because of collinearity problems probably accounts for this large negative residual. In the following period Glasgow's volume of new industry, although small, was about the expected size. The principal explanation for the city's lack of attraction

at this time is its exceedingly poor image, as measured by the particular variable (overcrowding) used in the equation. Glasgow experienced a far high degree of overcrowding than any part of Scotland. Consequently a poor physical environment seems to have exerted a powerful deterrent to incoming industry. Before this factor is taken into consideration the city's expected volume of new industry after 1965 was approximately 4,000 jobs, but the inclusion of image considerations dramatically reduces this to 1,500 jobs. From the evidence available therefore it seems reasonable to conclude that Glasgow's efforts to attract new industry are severely handicapped by an unfortunate image.

Dunbartonshire held less attraction than expected for immigrant firms after making allowance for its location, supplies of labour and factory space and its physical image. The fact that it also contained a new town specifically geared to attracting industry only adds to the complication in trying to explain this situation. A possible reason is the somewhat peculiar spatial arrangement of the county. It is the only one to be physically split into two separate areas, with most of the new factory space concentrated in the eastern sector around Cumbernauld and most of the labour in the western part around Clydebank and Dumbarton. By considering the county as a single spatial unit this peculiar geographical situation is ignored.

Both Renfrewshire and Ayrshire became less attractive in the latter 1960s and this cannot be accounted for simply by any change in the cost and availability of their factor inputs. In the former county a possible explanation is the build-up in employment at the Rootes Company car plant at Linwood, which is likely to have discouraged additional new firms from moving into the area.

Elsewhere in central Scotland, Stirlingshire proved more attractive than expected in both the 1950s and latter 1960s, but less attractive in the intervening periods. Midlothian experienced a very large and persistent deficit of incoming industry from 1960 and obtained little new industry despite a reasonably good supply of labour, sites and factories. Prior to 1966 the lack of Assisted Area status was a handicap, but it does not explain the continued lack of new industry. The most likely explanation appears to be

that the county was successful in attracting firms out of Edinburgh and had less incentive than other areas to seek immigrant industry from outwith Scotland.

West Lothian's success in attracting new industry can be largely attributed to its plentiful supply of industrial land and factories developed mostly by the local authorities and new town development corporation. Edinburgh, as expected, attracted no new industry in the 1960s. This reflected the lack of sites and factories, a relatively tight female labour market and exclusion from Assisted Area status. Fife's appeal to incoming industry can mainly be attributed to its supply of sites and premises and relatively plentiful female labour reserves. These factors do not account for the whole of its attraction, because in both periods during the 1960s the county had a positive residual. A possible explanation is the extremely active local authorities (including a new town development corporation) who paid particular attention to the requirements of immigrant industry.

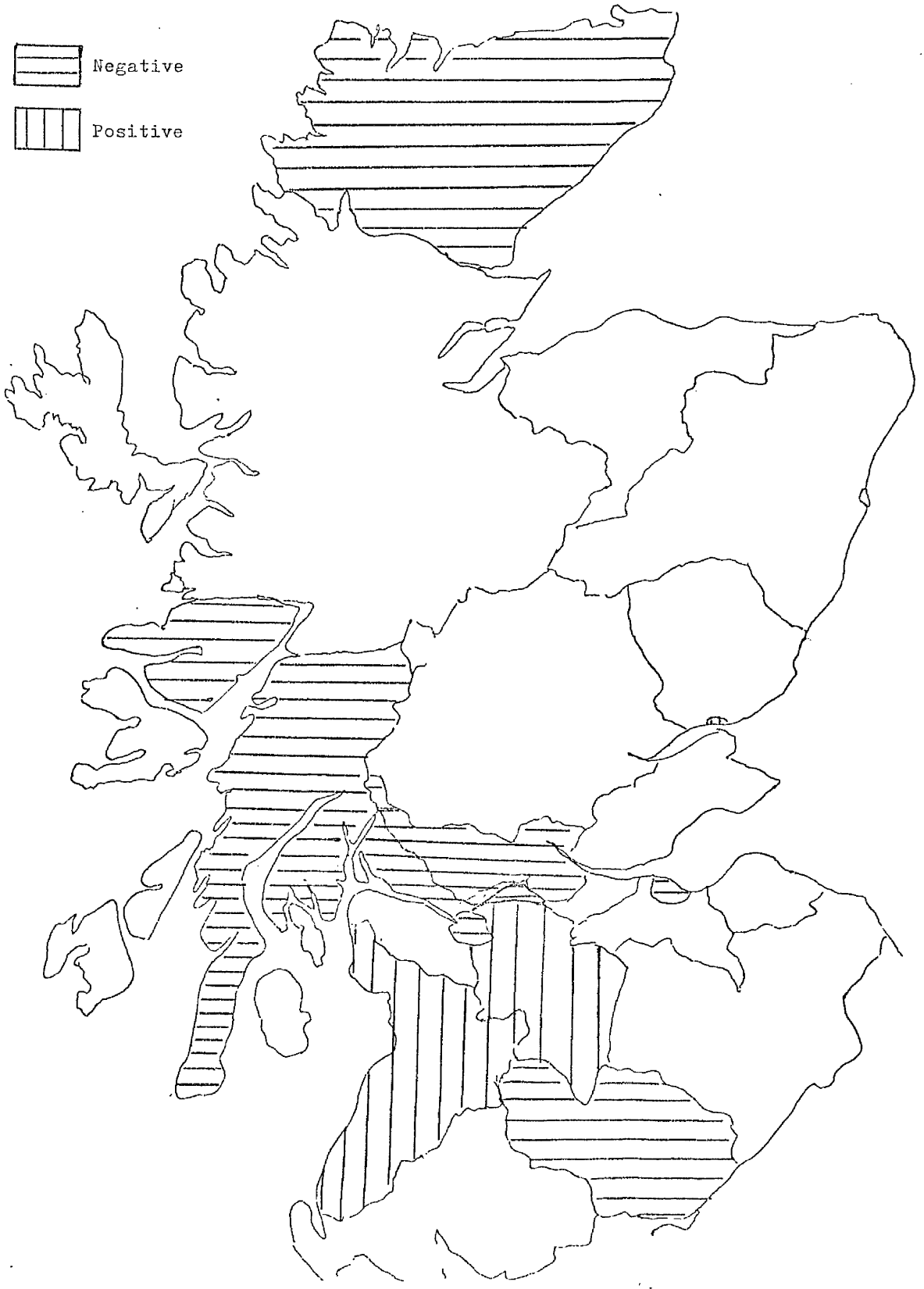
The appeal of the Borders seems to have been closely related to its supply of labour and factories. In contrast, the South West of Scotland attracted fewer jobs than might reasonably have been expected on the basis of its factor inputs during the 1960s.

The only time that Dundee and the Tayside counties experienced an unexpected shortfall of new industry was in the 1950s, when Dundee failed to attract a volume of industry commensurate with its supply of labour and sites/factories. This can probably be attributed to the continued build-up in employment by two large immigrant firms, NCR and Timex, who arrived in the previous period.

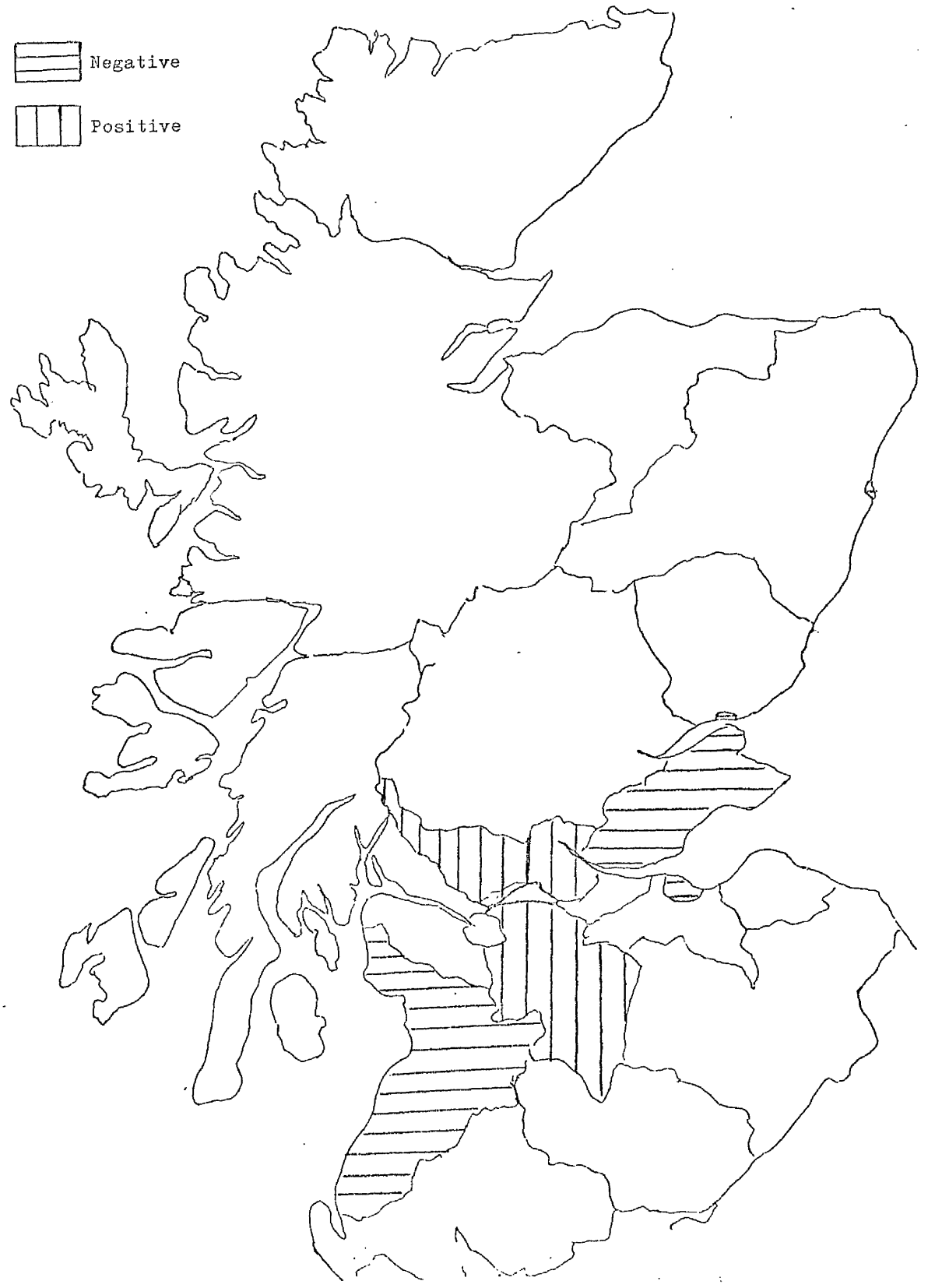
In the North East, Aberdeen county obtained its expected share of new jobs with the exception of the latter 1960s, when Aberdeen city proved more successful than expected. In this latter instance, however, the number of jobs involved was fairly small. In general this region was less competitive than much of the central belt owing to its remote location and fewer sites and new factories.

The Highlands display somewhat curious results, but in practice they are readily explicable. There were large negative residuals in Argyll and Caithness/Sutherland just after the war and again in the latter county after 1960. The presence of high unemployment rates in these areas has the effect of boosting the predicted level of employment to unreasonably high levels despite the lack of sites, factories and a large pool of labour. The very large notional surplus of jobs in Ross-shire and Inverness-shire after 1965 arises from the arrival of the large new pulp and paper mill near Fort William

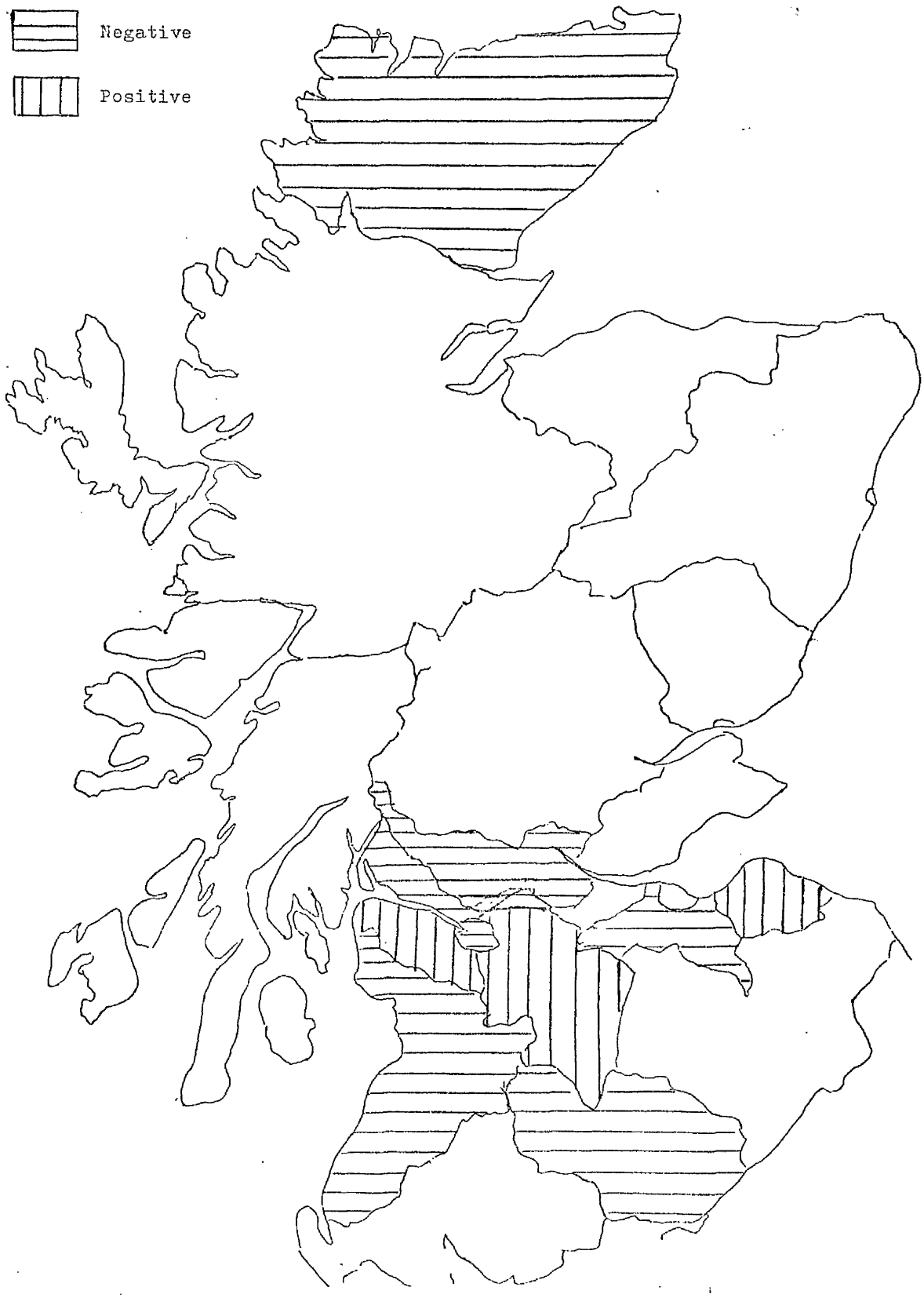
MAP 13.1 1945-51 RESIDUALS FOR TOTAL IMMIGRANT EMPLOYMENT (EQUATION 13.2)



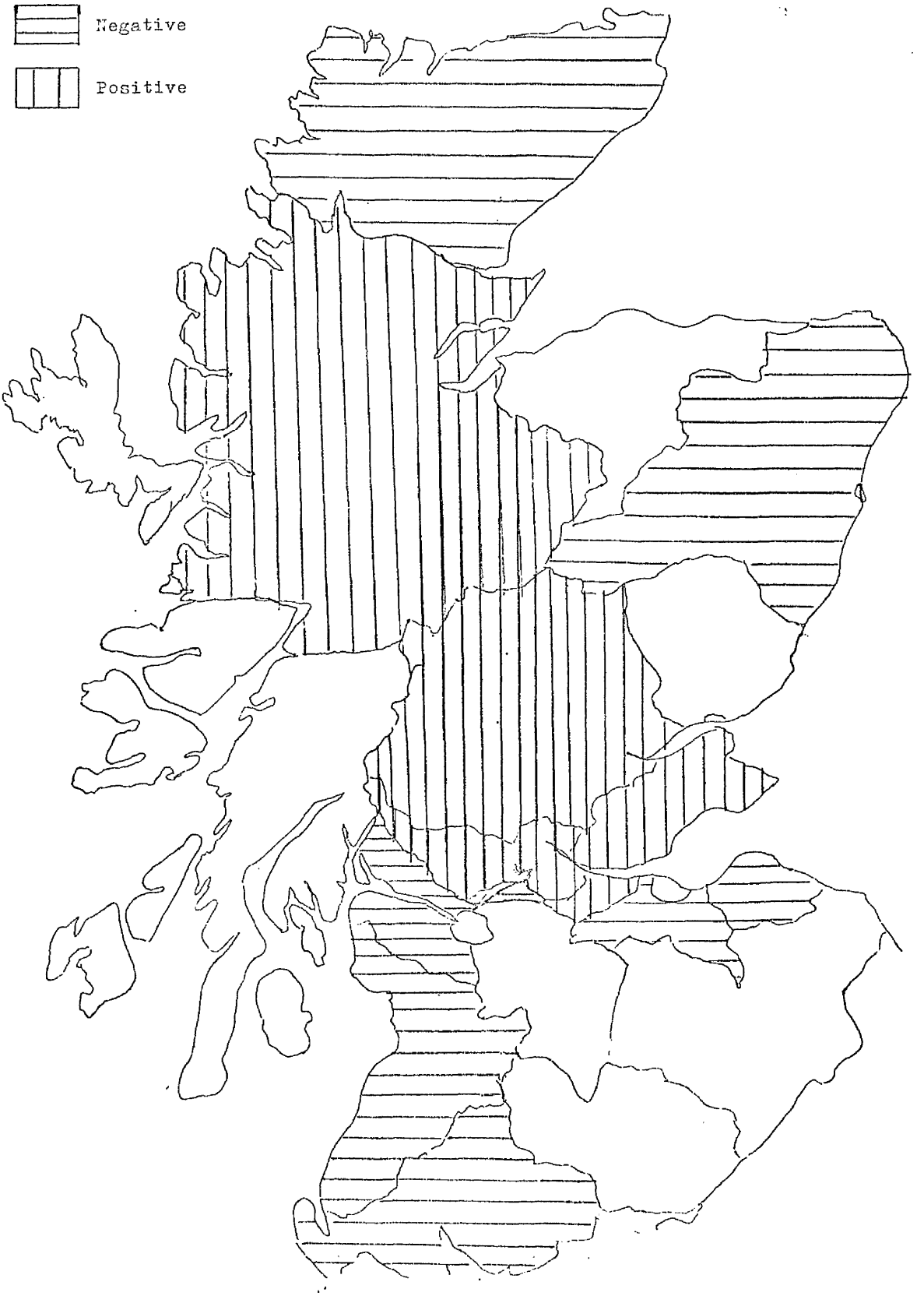
MAP 13.2 1952-59 RESIDUALS FOR TOTAL IMMIGRANT EMPLOYMENT (EQUATION 13.10)



MAP 13.3 1960-65 RESIDUALS FOR TOTAL IMMIGRANT EMPLOYMENT (EQUATION 13.20)



MAP 13.4 1966-70 RESIDUALS FOR TOTAL IMMIGRANT EMPLOYMENT (EQUATION 13.31)



13.6 SUMMARY OF THE REGRESSION ANALYSIS RESULTS

The statistical analysis provides encouraging support for the hypotheses advanced in the earlier sections. It is therefore possible on the basis of these results to identify the reasons for the changing distribution of immigrant industry during the course of the post-war period.

The availability of labour and factory space stand out as the only variables which are significant in every period both for all immigrants and for the engineering sector. Their relative importance does however vary from period to period. The peculiar conditions of the immediate post-war era, when factory space was at a premium, are apparent in that this was the outstanding location factor. Since this variable was also a surrogate for government policy at this time, it is clear that central government activity exerted a strong influence on the choice of location within Scotland. The concentration of government factory building and site development in the West of Scotland and Dundee, together with the large labour reserves in these areas, explains their attraction for incoming industry.

As the factory supply situation eased during the 1950s and regional policy effectively went into abeyance, the impact of government activity and of site and factory availability declined. They were replaced by labour supply as the outstanding requirement for incoming firms. The engineering industry proved an exception since it continued to place priority on the need for factory space. The West of Scotland with its abundant labour reserves and supply of factories continued to offer the most attractive locations to incoming establishments.

During the 1960s new immigrant industry began to spread away from the West of Scotland as other areas began to benefit from their own or central government advance factory and industrial estate development programmes. In addition female labour, which was demanded by the growing number of electrical engineering and clothing immigrants, became more readily available throughout Scotland at a time of rising unemployment.

Non-financial considerations such as an area's physical environment and the attendant image to which it gave rise also entered into the location decision process. This became possible as spatial cost differences within Scotland were eroded and both labour and factory space became more easily obtainable than previously outwith Clydeside. As a result the cost advantages previously enjoyed by the West of Scotland declined and for many firms were offset by the area's perceived higher psychic costs. This was particularly true in the case of Glasgow. Consequently incoming firms moved into new parts of Scotland and away from many of the traditional manufacturing centres which they had preferred in earlier periods.

CHAPTER 14

SUMMARY AND CONCLUSIONS

The findings of this study have a relevance for those regional industrial development policies which embrace the concept of attracting mobile manufacturing investment. Competition for new incoming industry has grown and is now particularly severe as a result of two trends. Firstly, both national and international economic difficulties in recent years, following the rapid increase in oil prices, have drastically reduced the supply of mobile industry, since it is closely dependent on industrial expansion. The decline in international growth rates has reduced the pressure to expand output since over rather than under-capacity has become a major problem in many countries and in particular in the UK.

Secondly, the demand for mobile industry has grown. One reason for this is the larger number of districts experiencing severe economic difficulties. This has led to an extension in the size of the areas eligible for assistance. For instance, Edinburgh is now a Development Area and no longer competing for incoming industry at a disadvantage compared with the rest of Scotland. In the non-assisted regions, IDC control has been relaxed in response to economic problems and this is likely to reduce further the potential supply of mobile industry to Assisted Areas such as Scotland. A further reason for a growing demand for new industry is the active development programmes undertaken since the mid-1960s by both local and central government in an ever-widening

range of locations. These have resulted in serviced sites and advance factories appearing in far more places than formerly. Competition to fill these additional sites and premises has increased accordingly.

As a consequence of these trends the supply of mobile industry has diminished at a time when demand for it is greater than ever, and so competition for mobile industry is now particularly acute. Any area unable to offer comparable facilities to its rivals is unlikely to attract new industry. Publicity alone is no substitute for positive development planning because in the absence of suitable sites, premises and labour supply industry will find little to attract it to an area. Gleaming factories rather than glossy publications are one prerequisite of a successful programme to attract new industry.

The analysis has shown the importance of available factory space as an inducement to immigrant industry. However, the type of floorspace is a relevant consideration, since old decrepit premises are likely to hold little appeal for most incoming firms. After all, by the late 1960s nearly two-thirds of immigrant industry started production in new premises and many of the remainder would subsequently move into new buildings. Those authorities able to offer modern factories or attractive sites on which new premises can either initially or subsequently be built will enjoy the strongest competitive position. The larger the choice of floorspace, the higher the probability that a firm's particular needs can be met. This places those areas with the biggest stock of modern premises or the largest building programmes at an advantage.

The results of the study suggest that development agencies should initially give priority to reducing costs by means of factory building and site development rather than to general environmental improvement designed to upgrade an area's physical image. Psychic costs become increasingly relevant as spatial cost differences decline so that they are only likely to operate in an area's favour if the cost and efficiency of its factor inputs approximate to those of competing areas. In the absence of suitable sites

and factories this is extremely improbable. Any such area is unlikely to be seriously considered by mobile industry, even though it might project a highly favourable image.

Edinburgh appears to illustrate this point in the 1960s, because despite a seemingly attractive image it failed to attract a single incoming plant. The reason was the unfavourable cost structure existing in the city. No government financial assistance was available since Edinburgh was outwith the Development Area and there was an acute shortage of modern premises and serviced sites. All these cost reducing features were readily obtainable just outside the city, thereby allowing the adjacent areas to benefit from Edinburgh's favourable image in their efforts to attract new industry.

This is not to conclude that considerations of environment are irrelevant. In fact the analysis has shown the opposite. However, they are only likely to operate in an area's favour if other costs are competitive. In such circumstances an area is likely to attract more industry than might reasonably be expected. The results also show that even those districts with poor physical and social environments can attract new industry provided that production costs can be reduced by the presence of suitable labour and sites or factories. This means that the efforts of central and local government in developing industrial facilities in even the most deprived areas can be extremely effective. The attraction of industry in the late 1960s to many small and relatively isolated mining communities in response to their designation as Special Development Areas and to the building of government advance factories illustrates this point very well. It is therefore quite possible to enhance the attraction to mobile industry of the most difficult areas by an active industrial development programme.

Nevertheless, the study shows that such policies are not without their costs because those places with an unfavourable image are likely to attract less industry than other areas with comparable facilities. This consideration appears to lie at the heart of Glasgow's inability to attract the volume of industry during the 1960s that might reasonably have been expected on the basis of the

factor inputs available in the city. Certainly the relative shortage of modern factory space was an additional handicap, but it alone cannot explain the dearth of incoming industry.

The development of additional sites and factories in new locations has several important implications at a time of a reduced inflow of mobile industry. It raises the question of the best use of resources because there is the possibility of an over-provision of new factories and sites, with a surplus persisting for some time. Normally an excess of premises is necessary during a recession to ensure that sufficient factory space is available for the ensuing upturn in the economy. The situation is however made particularly difficult at the present time. The supply of factories now appears to be very large by historical standards, reflecting active central and local government and new town building programmes, whereas the demand for new premises is likely to recover more slowly than previously if economic recovery continues at a slower speed than in the past. An additional complication would arise if the structure of mobile industry were to change. Incoming industry in the 1960s was dominated by plants in the electrical engineering and clothing industries, which were also those displaying the strongest demand for ready built premises. If these industries decline in relative prominence amongst mobile firms and are replaced by others such as the oil related sector which might be less dependent on existing factory space then the demand for available premises could fall. As a result the presence of an existing building could exert a less powerful influence on the location decisions of immigrant industry than formerly.

The greater availability of modern premises and their presence in a wider range of locations is likely to have further reduced spatial cost differences. The consequence of this, in the absence of any increase in other production or transport cost differences, could be that psychic costs continue to exert an increasing influence on the location decision. An industrialist's production requirements can now be met in a larger number of locations than formerly. This widens his choice of potential sites and allows him to locate in the district he finds most attractive on personal grounds. In such circumstances those places with the least favourable physical and social environments are likely to experience

growing difficulties in attracting new industry. Previously they could, at least to some extent, offset these drawbacks by developing serviced sites and advance factories which were not available in other more attractive areas. The wider distribution of factories has eroded, if not eliminated, any advantages they formerly enjoyed in this respect.

This study has concentrated on the changing distribution of incoming industry in the post-war period up until 1970. It has identified likely reasons for these changes and some implications have been drawn for industrial development policies. Since 1970 a number of important changes have affected mobile industry. New incentives have been introduced, the Assisted Area has been extended, the structure of immigrant industry has once again changed with the influx of the oil related sector into Scotland, and perhaps most important of all both the UK and the West have experienced a changed and more hostile economic climate. One effect has been to reduce greatly the volume of mobile industry moving to the Assisted Areas and policy is shifting towards a greater reliance on established industry for future employment growth. Nevertheless incoming industry is likely to remain of interest and importance to policymakers.

REFERENCES

ASHCROFT, B and TAYLOR, J (1976) The Movement of Manufacturing Industry and the Effectiveness of Regional Policy. Paper given to the Urban and Regional Study Group Conference at Glasgow University, May, 1976.

BROWN, A J (1969) Impact of Investment Grants on Capital-Intensive Industry. Appendix J, The Intermediate Areas: Report of a Committee under the Chairmanship of Sir J Hunt, HMSO, London.

BROWN, A J (1972) The Framework of Regional Economics in the United Kingdom. Cambridge University Press, Cambridge.

CAMERON, G C (1971) Economic Analysis for a Declining Urban Economy. Scottish Journal of Political Economy, 18.

CAMERON, G C (1974) Regional Economic Policy in the United Kingdom. Chapter 1 in Regional Policy and Planning for Europe, Editor Sant, M E C. Saxon House, Farnborough, Hants.

CAMERON, G C and CLARK, B D (1966) Industrial Movement and the Regional Problem, University of Glasgow, Social and Economic Studies Occasional Paper No 5. Oliver & Boyd, Edinburgh.

CAMERON, G C and REID, G L (1966) Scottish Economic Planning and the Attraction of Industry, University of Glasgow, Social and Economic Studies Occasional Paper No 6. Oliver & Boyd, Edinburgh.

CAMERON, G C, FIRN, J R, et al (1974) The Determinants of Urban Manufacturing Location - A Simple Model. Chapter in London Papers in Regional Science, Vol 2. (Editor - E Cripps). Pion Publications, London.

CHAMBERLAIN, E H (1936) The Theory of Monopolistic Competition. Harvard University Press, Cambridge, Mass.

CHISHOLM, M (1964) Must we all live in South East England? Geography, 49.

CHISHOLM, M (1966) Geography and Economics. G. Bell & Sons, London.

CLYDE VALLEY REGIONAL PLAN (1946) HMSO, Edinburgh.

CMND 2188 (1963) Central Scotland: A Programme for Development and Growth. HMSO, London.

CMND 2206 (1963) The North East: A Programme for Development and Growth. HMSO, London.

CMND 2864 (1966) The Scottish Economy 1965-70: A Plan for Expansion. HMSO, Edinburgh.

CULLINGWORTH, J B (1968) A Profile of Glasgow Housing, 1965. University of Glasgow Social and Economic Studies, Occasional Paper No 8. Oliver & Boyd, Edinburgh.

CUMBERNAULD DEVELOPMENT CORPORATION (1961) Annual Report for 1960/61. HMSO, Edinburgh.

DAVIES, G (1967) Regional Unemployment, Labour Availability and Redeployment. Oxford Economic Papers, March, 1967.

EAST KILBRIDE DEVELOPMENT CORPORATION (1965) Annual Report for 1964/65. HMSO, Edinburgh.

ECONOMIST, THE (1965) Industrial Scotland - A Nation Catches Up. 6th November, 1965.

EDWARDS, S L (1970) Transport Cost in British Industry. Journal of Transport Economics and Policy, 4, London.

EDWARDS, R S and TOWNSEND, H (1958) Business Enterprise: Its Growth and Organisation. Macmillan, London.

EMPLOYMENT, DEPARTMENT OF (1976) Distribution and Concentration of Industrial Stoppages in Great Britain. Department of Employment Gazette, 11.

ESTALL, R C and BUCHANAN, R O (1973) Industrial Activity and Economic Geography. Bell, London.

EVERSLEY, D E C (1965) Social and Psychological Factors in the Determination of Industrial Location. Papers on Regional Development (edited by T Wilson), Blackwell, Oxford.

FALKIRK/GRANGEMOUTH REGIONAL SURVEY AND PLAN (1968) Volume 1, Economic and Social Issues. HMSO, Edinburgh.

FORSYTH, D J C (1972) US Investment in Scotland. Praeger, London.

GALBRAITH, J K (1967) The New Industrial State. Houghton Mufflin, Boston.

GLASGOW CORPORATION (1959) Industry on the Move. Glasgow.

GLENROTHES DEVELOPMENT CORPORATION (1954) Annual Report for 1953/54. HMSO, Edinburgh.

GLENROTHES DEVELOPMENT CORPORATION (1961) Annual Report for 1960/61. HMSO, Edinburgh.

GOULD, P R and WHITE, R R (1968) The Mental Maps of British School Leavers. Regional Studies, 2.

GREENHUT, M L (1956) Plant Location in Theory and in Practice. University of North Carolina Press, Chapel Hill.

GREENHUT, M L (1959) An Empirical Model for and a Survey of New Plant Location in Florida. Review of Economics and Statistics, 41.

HAUSER, D P (1974) Some Problems in the Use of Stepwise Regression Techniques in Geographical Research. Canadian Geographer, 18.

HENDERSON, R A (1972) The Structure of Industry on the Ronald Lyon Industrial Estates in Glasgow. Internal Working Paper, University of Glasgow.

HENDERSON, R A (1974) Industrial Overspill from Glasgow: 1958-68. Urban Studies, 11

HOLTERMANN, S (1975) Areas of Urban Deprivation in Great Britain: An Analysis of 1971 Census Data. Social Trends, 6.

HOOVER, E M (1937) Location Theory and the Shoe and Leather Industries. Harvard University Press, Cambridge, Mass.

HOOVER, E M (1948) The Location of Economic Activity. McGraw-Hill, New York.

HOTELLING, H (1929) Stability in Competition. Economic Journal, 39.

HOWARD, R S (1968) The Movement of Manufacturing Industries in the United Kingdom, 1945-65. HMSO, London.

ILAG (1973) Inquiry into Location Attitudes and Experiences. Department of Industry evidence to the Expenditure Committee (Trade and Industry Sub-committee) on Regional Development Incentives. House of Commons, 85. HMSO, London.

INDUSTRY, DEPARTMENT OF (1973) Immigrant Industry from the UK - Scope and Criteria for Discrimination by Industry and Company. Paper given at a Symposium at Glasgow University, February, 1973.

ISARD, W (1956) Location and the Space Economy. MIT Press, Cambridge, Mass.

ISARD, W (1960) Methods of Regional Analysis. MIT Press, Cambridge, Mass.

KEEBLE, D E (1968) Industrial Decentralisation and the Metropolis: The N W London Case. Institute of British Geographers, Transactions, 44.

KEEBLE, D E (1971) Industrial Mobility in Britain, Chapter 2 in Spatial Policy Problems of the British Economy (edited by M Chisholm and G Manners). Cambridge University Press, Cambridge.

KEEBLE, D E (1972) Industrial Movement and Regional Development in the United Kingdom. Town Planning Review, 43.

KEEBLE, D E and HAUSER, D P (1972) Spatial Analysis of Manufacturing Growth in Outer South East England, 1960-67: II, Methods and Results. Regional Studies, 5.

KLAASEN, L H (1965) Area Economic and Social Redevelopment: Guidelines for Programmes. OECD, Paris.

LIVESEY, F E (1961) Recent Economic Trends in North East Scotland. Scottish Journal of Political Economy, 8.

LIVINGSTON DEVELOPMENT CORPORATION (1971) Annual Report for 1970/71. HMSO, Edinburgh.

LÖSCH, A (1954) The Economics of Location (translated). Yale University Press, New Haven, Conn.

LOTHIANS REGIONAL SURVEY AND PLAN (1966) Volume 1, Economic and Social Aspects. HMSO, Edinburgh

LUTTRELL, W F (1962) Factory Location and Industrial Movement: A Study of Recent Experience in Great Britain. National Institute of Economic and Social Research, London.

McARTHUR, A and KINGSLEY LONG, H (1956) No Mean City. Neville Spearman, London.

McCALLUM, J D (1973) UK Regional Policy 1964-72. Chapter in Cities, Regions and Public Policy (Editors - G C Cameron and L Wingo). Oliver & Boyd, Edinburgh.

McCRONE, G L (1969) Regional Policy in Britain. George Allen & Unwin Ltd, London.

MACKAY, D I, BODDY, D, BRADE, J, DIACK, J A and JONES, N (1971) Labour Markets under Different Employment Conditions. University of Glasgow Social and Economic Studies. Allen & Unwin, London.

McWHIRTER, W (1973) Glasgow: the Meanest City. Time International, Amsterdam.

MANPOWER STUDIES RESEARCH UNIT (1974) The Perception of English Managers and their Wives concerning Scotland and Scottish Workers. Heriot-Watt University, Edinburgh.

MARTIN, K (1968) Anatomy of a Contemporary Gang. Observer Colour Magazine, 1st December, 1968.

MOODY, T and SMITH, K G D (1973) The Evaluation of General and Regional Investment Incentives. Paper given to the Scottish Economists Conference at the Burn, Edzell, Angus, September, 1973.

MOORE, B and RHODES, J (1973a) Evaluating the Effects of British Regional Economic Policy. Economic Journal, 83.

MOORE, B and RHODES, J (1973b) The Economic and Exchequer Implications of Regional Policy. Minutes of evidence taken before the Expenditure Committee (Trade and Industry Sub-committee), House of Commons, 42. HMSO, London

MOORE, B and RHODES, J (1974) Regional Policy and the Scottish Economy. Scottish Journal of Political Economy, 21.

MOORE, B and RHODES, J (1976) Regional Economic Policy and the Movement of Manufacturing Firms to Development Areas. Economica, 43.

NATIONAL ECONOMIC DEVELOPMENT COUNCIL (1963) Conditions Favourable to Faster Growth. HMSO, London.

NEEDLEMAN, L (1965) What are we to do about the Regional Problem? Lloyds Bank Review, 75.

NEEDLEMAN, L (1968) Regional Analysis. Penguin, London.

NEEDLEMAN, L and SCOTT, B (1964) Regional Problems and the Location of Industry Policy in Britain. Urban Studies, 1.

ODBER, A J and BOWDEN, P J (1958) Rent Subsidies in the Development Areas. Journal of Industrial Economics, October, 1958.

PALANDER, T (1935) Beitrage zur Standortstheorie (quoted by Smith, 1971).

PATRICK, J (1973) A Glasgow Gang Observed. Eyre Methuen, London.

POLITICAL ECONOMY, DEPARTMENT OF (1932) An Industrial Strategy of the South West of Scotland. HMSO, London.

PRED, A (1967) Behaviour and Location: Foundations for a Geographic and Dynamic Location Theory, Part I. Lund Studies in Geography, Series B, 27.

RAWSTRON, E M (1958) Three Principles of Industrial Location. Transactions and Proceedings of the Institute of British Geographers, 25.

RICHARDSON, H (1969) Regional Economics. Weidenfeld & Nicolson, London.

RILEY, R C (1973) Industrial Geography. Chatto and Windus, London.

SANT, M E C (1971) Towards a Forecasting Framework for Inter-regional Industrial Movement. Paper given to the Regional Studies Association Conference, September, 1971.

SANT, M E C (1975) Industrial Movement and Regional Development: the British Case. Pergamon Press, Oxford.

SCOTTISH ECONOMIC PLANNING DEPARTMENT (1974) Memorandum submitted as evidence to the House of Commons Expenditure Committee (Environment and Home Office Sub-committee) on New Towns. HMSO, London.

SCOTTISH HOUSING ADVISORY COMMITTEE (1967) Scotland's Older Houses. Report of the Sub-committee on Unfit Housing. HMSO, Edinburgh.

SIMON, H A (1959) Theories of Decision-Making in Economics and Behavioural Science. The American Economic Review, 49.

SMITH, D M (1966) A Theoretical Framework for Geographical Studies of Industrial Location. Economic Geography, 42.

SMITH, D M (1969) Industrial Location and Regional Development - Some Recent Trends in North West England. Environment and Planning, 1.

SMITH, D M (1971) Industrial Location: An Economic Geographical Analysis. John Wiley & Sons Inc, New York.

SOUTH EAST JOINT PLANNING TEAM (1971) Strategic Plan for the South East, Studies Vol 5. HMSO, London.

SPRINGBURN STUDY (1966) The Springburn Study: Urban Renewal in a Regional Context. Glasgow Corporation and University of Glasgow, Glasgow.

STEUER, M D et al (1973) The Impact of Foreign Direct Investment in the United Kingdom. HMSO, London.

TAYSIDE STUDY (1970) Tayside: Potential for Development. HMSO, Edinburgh.

THOMAS, R (1971) The new Investment Incentives. Bulletin of the Oxford University Institute of Statistics, 33.

TOOTHILL, J (1961) Report of the Committee of Inquiry into the Scottish Economy. Scottish Council (Development and Industry), Edinburgh.

TOWNROE, P M (1971) Industrial Location Decisions: A Study in Management Behaviour. Centre for Urban and Regional Studies, Birmingham.

WEBER, A (1909) Alfred Weber's Theory of the Location of Industries, translated by Friedrich, C J from Über den Standort der Industrien (1909). University of Chicago Press, Chicago.

WEST CENTRAL SCOTLAND PLAN (1974) The Regional Economy, Supplementary Report No 1. West Central Scotland Plan Team, Glasgow.

WILLIAMS, A (1968) Where Razors and Knives are Manly Weapons. Sunday Times Colour Magazine, London.

WILSON, T (1964) Policies for Regional Development. University of Glasgow Social and Economic Studies, Occasional Paper No 3. Oliver and Boyd, Edinburgh.

WILSON, T (1967) Finance for Regional Industrial Development. Three Banks Review, September, 1967.